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ORIGINAL COMMUNICATIONS.

ART. I.—* *The Spectroscope: its Value in Medical Science.* By GEORGE B. FOWLER, M.D., Examiner in Physiology, College of Physicians and Surgeons, New York; Visiting Surgeon to the New York Dispensary, etc. Read before the New York Academy of Medicine, April 20, 1876.

In 1670, or thereabout, Newton discovered the compound nature of white light. That is, he found that when a beam of pure sunlight is allowed to pass through a prism, it undergoes two changes. First, the direction is altered, or the rays are refracted; and, secondly, it is no longer white light, but broken up into seven distinct colors, each merging imperceptibly into the other, and arranged in the following order: red, orange, yellow, green, blue, indigo, and violet.

According to modern science, the reason for this order of colors is found in the theory that luminous bodies impart to the ether waves of different lengths, and while passing through a prism the short waves are most retarded and the long ones least. Now, violet light is composed of short waves and red light of long ones. Therefore the violet is most retarded or bent, while the red pursues almost a straight course through the glass. The red and violet are consequently at each extreme of the spectrum, while the other colors arrange themselves according to their comparative wave lengths.

* This paper, which was printed in the Transactions of the New York Academy of Medicine, appears also in this Journal, in accordance with a by-law of the Academy permitting such separate publication, at the option of writer.

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In 1802 Dr. Wollaston, of England, announced that the solar spectrum was not a continuous one, but was interrupted by a great many very fine, dark lines. Some years later—1812—a German physicist, Frauenhofer, investigated the character and positions of these remarkable lines, and found them to be constant and invariable in location. To the most prominent he applied the first eight letters of the alphabet, A, B, C., etc., and to-day we speak of Frauenhofer line, B or E, or any particular one, to denote the region of the spectrum to which we wish to call attention. (See fig. 1.)

The significance of these lines remained a secret until 1814, when Kirchoff, in Heidelberg, made the startling announcement that they were due to the absorption of certain rays by the atmosphere surrounding the sun. He showed that if a metal be made incandescent, and its light passed through a prism, there would appear a number of bright lines in the spectrum, corresponding in position to some of the dark ones of the solar spectrum. Take, for example, the metal sodium, or any of its compounds, and placing a small quantity upon the end of a platinum wire, subject it to the flame of a spirit lamp, immediately the entire flame is yellow with the incandescent sodium vapor. Permit the light from this vapor to pass through a prism, and we will see a very fine, bright-yellow line running vertically across the spectrum in the *yellow.*

Having noted the exact position of this line, remove the sodium flame and substitute a beam of sunlight. The beautiful, full spectrum now appears, and just exactly where the yellow line of sodium existed is situated the dark Frauenhofer line D. Here, then, was a striking coincidence of location, and regarding the phenomenon as something not to be overlooked, Kirchoff at first theorized and subsequently proved the dark line at D in the solar spectrum and the bright line at D in the spectrum of incandescent sodium to be identical, due in each case to the presence of the vapor of the metal

sodium. This is the way he arrived at the conclusion: He first saw that in the light of the sun the D line was *dark*, while the glowing sodium gave a *bright* line. The thought occurred to him that the conditions were reversed, and he proceeded to experiment accordingly; and, without going too much into details, finally established the fact that *when the metal is itself luminous, or the source of light, the lines in the spectrum will be bright, but if the source of light be beyond the vapor of the metal the lines will be dark.* In other words, if we volatilize sodium in *front* of a bright flame, and cause the light from the flame to pass through the vapor before entering the prism, the sodium line is *reversed*, it is dark. And so for other metals. Upon these experiments is based the present theory regarding *the constitution of the sun.**

The delicacy of spectrum analysis in detecting metals varies with different ones. Of sodium, one two-hundred millionth of a grain will bring out the bright line at D; of lithium, one sixty-millionth; and of calcium, one one-millionth of a grain is sufficient to produce the characteristic effect.

It has been for some time observed that if the beam of light employed were permitted to pass through a colored fluid, before or after entering the prism, certain marked changes were invariably manifest in the spectrum. First, the most refrangible end (violet and blue) is entirely absorbed; and, secondly, one or more isolated dark bands of absorption are seen in the other colors, the same coloring matter giving definite and invariable absorption.

Very naturally, physiologists caught the idea, and soon

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* That it is an intense mass of luminous matter in whose composition the metals play certainly an important part, and being constantly volatilized by the great heat, are present in the atmosphere of the planet and absorb certain rays, according to the law established by Kirchoff, *that metals in a gaseous state are opaque to those rays which they themselves are capable of emitting when incandescent.*

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resorted to spectrum analysis in the cases of the colored animal fluids, blood, bile, and urine.

A brief description of the spectroscope, and a few words concerning its technology, are in place at this stage.

Spectroscopes are of various patterns and degrees of complication. A convenient form is made by Browning, of London. There is a narrow slit, regulated by a screw, through which the beam of light is admitted to the collimator tube. At the other end of this tube is a convex lens, which collects the rays and sends them parallel to the prism. Here they are bent and broken up into the various colors, and are finally collected and magnified in the observing telescope. The observing telescope is arranged in such a manner as to allow of its rotation horizontally around the stand. This movement brings the different parts of the spectrum successively into view. The eye-piece is provided with two very small wires crossed in the center of the field. These wires are a portion of the measuring apparatus. When the position of a line or band is to be ascertained, the point of decussation of the wires is placed exactly over the object in such a manner that the reëntering angles shall be equally divided by it. Reference is now made to a graduated scale upon the circular top of the stand and to a vernier scale sliding upon it and attached to the observing telescope. The position of the sun lines having been previously determined, it is easy to ascertain the location of absorption lines. Vierordt, a writer upon absorption spectra, proposes a very simple and convenient measuring method.* He considers the spaces between

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* *Die Anwendung des Spectral Apparates zur Photometrie der Absorptionspectren. Tübingen*, 1873.

There are several other scales in use, but they require an additional tube than is possessed by the simple instrument already described. In this tube there is a scale photographed upon glass, and so adjusted and illuminated that it is seen with the spectrum. This extra attachment

the fixed lines, A, B, C, etc., as divided into one hundred equal parts, and then indicates the position of an absorption band by the expression of its distance from any one of them. As C 50 D. But I fail to see the use of writing "D." So, with the exception of writing *the following letter*, this method will be employed in this paper.

I propose to speak of the fluids separately and in the following order: *Blood, Bile, Urine*

BLOOD.

The coloring matter of the blood has been given a number of different names within the last ten years, which has created considerable confusion, particularly among those who are not especially interested in physiological chemistry, and have not followed the discussions on the subject. We see it called hæmatin, hæmatoin, hematosin, cruorine, hæmatocrystalin, hæmoglobulin, and hæmoglobin. Berzelius suggested the term hæmatoglobin. Hemaglobin is employed by Hoppe-Seyler and the Germans, and will be used in this paper. Of some of the others we shall say more further on.

Hæmoglobin has the chemical composition $C^{54.2}H^{7.2}O^{21.5}N^{16}Fe.^{42}S.^{7}$, and is a crystallizable substance. It was first obtained pure by Kölliker* in 1849 from the blood of the dog and fishes, and very soon afterwards, 1851, by Funke† in the blood of man and the horse. The crystals are procured with variable success in different animals. The blood of dogs and guinea-pigs seems to yield them with greater certainty.

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involves greater expense, and I must say that I have found the method described in the text to be perfectly satisfactory for physiological work.

See "A New Method of Determining the Position of Absorption Bands," etc. By J. C. Dalton, M.D. Trans. New York Academy of Medicine, 1874.

"On a Definite Method of Qualitative Analysis of Animal and Vegetable Coloring Matters." By H. C. Sorby. Phil. Mag. (4th Series), XXXIV.

* Microscopical Anatomy. Phila. Ed., 1854, p. 714.

† "De Sanguine Venæ Lienalis." Lipstadt, 1851.

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They possess the same spectroscopic properties as a watery solution of blood, which is much easier to obtain.

Pure defibrinated blood is perfectly opaque in any appreciable volume, and is not suitable for spectroscopic work. But when a small quantity of water is added the corpuscles are deprived of their coloring matter, which is perfectly soluble in water, and what is left of the albuminous corpuscle is practically transparent. So that we now have a tolerably pure solution of hæmoglobin, more or less translucent according to the degree of dilution.

Suppose we take a cubic centimetre of pure defibrinated ox-blood, and, diluting it with an equal volume of water, place it before the slit of the spectroscope. We shall find every thing dark with the exception of a narrow band of bright red. While the eye is still at the instrument add, very gradually, more water, and observe the remarkable change. By degrees the red band grows wider, then the *orange* appears. A very slight additional dilution will permit the *green* rays to pass, and now the appearance is that represented in fig. 3 of the chart. The *red*, *orange*, and a portion of the *yellow* showing at one extremity of the spectrum, and a dark, broad band, with its edges well defined, separated from the darkness of the other extremity by a band of *green* light. The position of this band would be indicated by saying that it commenced at about D and extended to about E 10. (The position of all absorption bands is more or less affected by concentration of the solution and the thickness of the layer through which the light has to pass.) This, then, is the spectrum of what we should call a pretty concentrated mixture of blood.

Proceeding now to dilute with water, very carefully, another change will take place. Gradually the light appears in the rest of the *green* and the beginning of *blue*. But note the singular operations at work in the broad dark band. It has been divided by a strip of yellowish green, and now

we have two absorption bands. The first narrow, dark, with sharp-cut edges, situated at the right of D; the second broader, its borders blurred and placed just on the left of E. *This is the characteristic spectrum of oxygenated hæmoglobin*, that to which Hoppe-Seyler first called attention.* (See fig. 4, chart.)

It is possible to carry the dilution to a surprising extent before these bands disappear. As water is further added the entire spectrum gradually clears up, interrupted only by the very indistinct and shadowy remains of the two original bands. And it is interesting and important to observe the greater persistence of the first, for when its mate has quite vanished it is still to be seen.

Hoppe-Seyler thought that these phenomena would be of great assistance in ascertaining the nature of the coloring matter, and enable him, perhaps, to follow it through its decompositions to the bile and urine, the color of which fluids have been thought to be due to altered hæmoglobin.

He found that alkaline carbonates and caustic ammonia did not affect the spectrum, that is, did not alter the hæmoglobin, but that acids and fixed caustic alkalies decompose it with an accompanying change in the spectrum; but more of this hereafter.

† Professor Stokes, of England, attracted by Hoppe-Seyler's paper, pursued another path of inquiry.

So much having been said about the difference in color between arterial and venous blood being due in the one case to the presence of oxygen and in the other to its absence, he sought the aid of the spectroscope in the matter, and performed the following experiments:

Taking a solution of ox-blood which showed the two bands (fig. 4), he desired to find out whether they were in any way due to the presence or absence of oxygen. He there-

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* Virchow's Archiv., xxiii., 1862, p. 446.

† Proceedings Royal Society, xiii. volume, 1864.

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fore added reducing agents which would appropriate any free oxygen in the solution. Ferrous sulphate, to which a little tartaric acid had been added, and then made alkaline with ammonia, was generally employed. (The agent was to be used with an alkaline fluid, and the tartaric acid is put in to prevent a precipitation of ferrous carbonate.) When a little of such a deoxidizing substance is added to our blood solution, the first thing noticed is a darkening of color, recalling the hue of venous blood. But for us the most important change has occurred in the spectrum. Placing the altered blood before the slit of the spectroscope, we are confronted with a remarkable change. Our pair of distinct bands have disappeared, and a single dim, broad band is seen, commencing at about D 10, and extending to D 90. The spectrum has also become visible as far as G (fig. 5, chart).

Stokes reasoned that this must be the spectrum of reduced blood. The proof was simple. Shake the solution with air, and ascertain whether the single band will give place to the original two. It does, and the reduction and oxygenation may be repeated until the color of the reagent begins to interfere with that of the blood. It was ascertained that these changes were not due to the color of the reagent employed, as others perfectly colorless gave the same result.

Stokes also found that if a full bottle of oxygenated blood solution be tightly stoppered and set aside for about twenty-four hours, at the end of that time the color will have changed to that of our reduced hæmoglobin, and the same change in the spectrum will have been effected. Agitation with air will restore the red color and the bands of oxygenated hæmoglobin.

These phenomena are very interesting, and are indeed, as proved by Professor Stokes, the analogues of what takes place in the blood in the living body. The äerated hæmoglobin represents arterial blood, and reduced hæmoglobin venous.

Stokes's conclusion is "that the coloring matter of the blood is capable of existing in two states of oxydation, distinguishable by a difference in color and a fundamental difference in their action on the spectrum. It may be made to pass from the more or less oxygenated state by suitable reducing agents, and recover its oxygen again from the air."

But it is important to mention here that venous blood, as it exists in the circulation, does not give the spectrum of venous hæmoglobin. Dr. Sharpey, of London, has demonstrated this fact, and we have repeated his experiments. In order to demonstrate this, it is of course necessary to render the blood transparent; but the addition of water is equivalent to äeration. Therefore we must employ water from which all the air has been expelled by boiling in vacuo.

A glass syringe having been filled with this water, the nozzle is inserted into a vein and a few drops of blood drawn up. The solution thus contained in the glass cylinder is placed before the spectroscope for examination; and as before stated, venous blood under normal conditions gives the two bands of oxygenated hæmoglobin. This is only another of the wise arrangements of Nature where she provides against sudden arrests of respiration proving instantaneously fatal. These experiments prove that there is sufficient oxygen in venous blood to bear another circuit or so, and to meet the demands of nutrition. But suppose oxygen is prevented entering the lungs for a longer time, or is permanently prevented, or is displaced from the blood by other gases, what should be the condition of venous and even arterial blood regarding oxydation then? Under such influences it has been found to be completely deoxidized, and to correspond spectroscopically with Stokes's reduced hæmoglobin (except in case of displacement by some gases, where we have other characteristic spectra). Of course, after the residual air has been exhausted from the lungs, the arterial blood will not differ from the venous.

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A. Schmidt* has found that destruction of the medulla oblongata and death by blows upon the head will enable one to see the broad band of reduced hæmoglobin in the blood of the animal. These are only modes of suspending respiration while the circulation is still maintained. In fact, all of these phenomena may be studied upon the living animal with the circulating blood. We have simply to employ a transparent living membrane, such as the web of the frog's foot, in the place of our blood solution. Then, although the picture is somewhat indistinct and mottled, on account of the interruption of the light by the tissues, the hæmoglobin bands are easily discerned; and, what is still more important, give place to the single reduced band if respiration is arrested.

We have already seen that it will occur in a solution of blood which is simply allowed to remain at rest protected from the air; and Schmidt, in the course of experiments just alluded to, with a view of determining the reducing power of different tissues upon blood, gives the following results:

If he exposed a muscle of a frog in blood outside of the body, and produced continuous tetanus, the oxygen was disassociated quicker than by a muscle at rest, but not so rapidly as by a dead muscle. Brain and liver substance reduced a watery solution very rapidly, the solution being at 0° C. The phenomena presented by the full bottle show that the blood itself contains substances, the nutritious matters, which have a great affinity for oxygen, but are not capable of appropriating it so rapidly as the coloring matter, and must needs be in longer contact with it in order to be oxidized. And the experiments of Schmidt demonstrate that the tissues are capable of producing the same change. In the hæmoglobin, oxygen is in a state of *physical admixture*

* Centralblatt, 146.

in the other ingredients of the blood, and in the tissues it is *chemically combined.*

That oxygen is very loosely combined with hæmoglobin is shown by the displacing power of various gases upon oxygenated blood, and by the results of submitting it to the air-pump.*

SPECTROSCOPIC EFFECTS OF GASES AND REAGENTS UPON BLOOD.

Carbonic Oxide, CO.—When a stream of this gas is passed through äerated blood, the oxygen is displaced and the carbonic oxide unites with the coloring matter in equal volume.

Before the spectroscope carbonic oxide blood shows very interesting peculiarities. We have two about equally wide and dark bands, situated in the yellow, between D and E. To the unpracticed eye they might seem identical with the bands of oxy-hæmoglobin. But these latter do not bear so close a resemblance to each other as those now under consideration, and are situated further towards the blue.

The distinguishing feature of the carbonic oxide bands, however, is to be found in their behavior with both reducing and oxidizing agents. *Neither of these affect them.* But if the solution be allowed to stand for several days at an ordinary temperature, these bands disappear, and the broad band of reduced hæmoglobin is substituted.

Hoppe-Seyler first showed that blood in combination with carbonic oxide would not be affected by reducing agents, and Dr. Gamgee† found that carbonic oxide would produce the same bands after reduction had been accomplished, and even in presence of an excess of the reducing agent. He further pointed out that poisoning by carbonic oxide or charcoal fumes invariably produces carbonic oxide blood.

* It has been found that when blood is subjected to the air-pump, its coloring matter will be deprived of its oxygen when the pressure falls to about 25 millemetres of mercury.

† Med. Times and Gazette, 1866, p. 325.

Nitrogen Monoxide, N^2O (Laughing-gas).—The effect of this gas upon blood is to produce an intense red color. There is, however, no change in the spectrum, and reducing agents will cause the broad band of Stokes to appear.

Carbonic Acid Gas, CO^2, simply displaces the oxygen, and shows the spectrum of reduced blood.

POISONS.

Preyer has experimented upon blood with a great variety of reagents, with most of which he obtained characteristic spectra. It is only necessary to mention a few to show that we have a valuable aid in the spectroscope in detecting these agents. (Harley* also, it may be mentioned, has published a detailed account of researches in this direction, but with no particular reference to the spectroscope.)

Nitrites.—We are indebted to Gamgee† for very interesting reports of the action of this class of substances upon the blood. He found that "all nitrites except that of silver show some crystalline form, color, and spectrum." The blood assumes a chocolate hue under their influence, the two oxy-hæmoglobin bands becoming very faint, and another appearing at C. Ammonia causes the two bands to grow more distinct, and two entirely new ones (making three) to show themselves in the orange; the blood at the same time resuming its red color.

Oxidizing and reducing agents act perfectly with nitrite-blood. The reducing agent first restores the normal oxy-hæmoglobin spectrum, and then induces that of deoxidized, seeming to show that the nitrite super-oxygenated the blood.

Nitrites so affect the blood as to enable it to resist the action of carbonic oxide. But the loose oxygen is not destroyed or dispelled; it appears to be "simply affected in an unknown manner." Gamgee founds this statement upon

* Proc. Royal Soc., Vol. XIII., p. 157.

† Philosophical Trans., 1868, p. 589.

the behavior of nitrite-blood with reducing agents; as we have just seen, they first restore the spectrum of oxy-hæmoglobin before inducing the reduction, without the aid of atmospheric air.

QUANTITATIVE SPECTROSCOPIC ANALYSIS OF HÆMOGLOBIN.

We have seen that blood gradually diluted before the slit of the spectroscope permits first the red and next the green light to pass (figs. 2 and 3). It has been found by Preyer,* to whom we owe so much in this department of physiological chemistry, that the degree of dilution which allows the green to show itself is so constant that a sufficiently accurate method of quantitative analysis of hæmoglobin can be based upon it. The process is as follows:

A concentrated solution of a known weight of hæmoglobin crystals are placed in a glass chamber with parallel sides which are one centimetre apart. This chamber or "hæmatinometer" is now placed before the slit of the instrument, and the light allowed to pass through. Then proceed very carefully to add distilled water from a finely graduated burette, and stop the moment green light begins to show. Observe the width of the slit and the position of the light.

The solution now contains a percentage of hæmoglobin, which will always be the same under the same conditions. Let K represent this percentage.

Now if we wish to estimate the percentage of coloring matter in a specimen of blood, we have only to repeat the above process. First be sure that the conditions as to the light and width of slit are the same. Then take a measured quantity of the blood, agitate it well with air, and dilute it with a small measured volume of water. This blood solution is then placed in the "hæmatinometer" before the slit, and further diluted with water from the graduated burette until the green begins to come through. Now

* Die Blutkrystalle, Jena, 1871, p. 121.

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we have arrived at the point reached in the first experiment. A little mathematical calculation only remains to ascertain the result. k = the percentage of hæmoglobin present under the given conditions. Let the total quantity of water added = w, and the amount of blood employed = b. Then we shall have the equation

$$x = k \frac{(w + b)}{b}$$

DECOMPOSITION PRODUCTS OF HÆMOGLOBIN.

The coloring matter of the blood is subject to spontaneous decomposition in the body and out of it. These decomposition products can also be produced by treating hæmoglobin or blood with certain reagents. Those best known and which give definite spectra are:

1. Hæmatin; 2. Hæmatoin; 3. Methæmoglobin; and 4. Hæmatoidin.

We shall study them in the order enumerated.

HÆMATIN.—$C^{96}H^{102}O^{18}N^{12}Fe^{3}$.

Caustic Potassa.—If a solution of hæmoglobin or blood be treated with caustic potassa, the color becomes brownish, and in its spectrum we have a dim broad absorption band, commencing at C 50 and extending to D 40 (see fig. 6, chart). This is hæmatin.

It is an important fact that this substance is capable of oxidation and reduction. The spectrum just described is that of oxygenated hæmatin. Add a small quantity of the reducing agent, and once more examining the spectrum observe what has taken place. The shadowy, broad band has gone, and the *green* and *blue* rays are much less obstructed. The most striking change, however, is the appearance of two entirely new bands, the first situated at D 30, and the second on the left of E. Both are very black, and remind us at once of the bands of oxygenated hæmoglobin. But a little attention will show that they are placed further to the

right, and another point of distinction is that the first band of reduced hæmatin is the broadest, and appears distinct before the second has begun to show itself (fig. 7, chart). By agitating the reduced solution with atmospheric air, these bands will disappear, and the single one of oxy-hæmatin will return. Hæmatin produced by this means was called by Stokes "alkaline hæmatin" to distinguish it from the products by acids. But it has been shown by Preyer that the "acid hæmatin" of Stokes is not hæmatin, but an entirely new substance which he calls *Hæmatoin.*

Caustic Ammonia.—Hoppe-Seyler describes hæmoglobin as unaffected by this reagent, but we have found it capable of producing hæmatin. It is true that the spectrum is not very decided in the oxygenated state, but reducing agents render the proof. We have found that a solution of blood treated with caustic ammonia placed before the slit of the spectroscope will not give any well marked band, but simply absorption of the refrangible end of the spectrum up to E. Treated with a reducing solution, the two black, sharp-cut bands of reduced hæmatin immediately appear, and what is important, they can be banished by agitation and made to reappear at pleasure by again reducing them.

Alkaline Carbonates.—Regarding the action of these substances, we must again differ from Hoppe-Seyler and agree with Burdon Sanderson* and Stokes that they determine the production of hæmatin. Their action is not so rapid, requiring a day or two, nor is the first spectrum like that of either of the preceding. The reduced spectrum is, however, the same.

We treated a solution of sheep's blood with carbonate of soda, and examined it after four days, kept at ordinary temperature. It then gave the bands of oxy-hæmoglobin quite indistinctly, and another well-marked in the orange on the right of C. On the application of deoxodizing agents, all of

* Hand-Book for the Physiological Laboratory, Am. Ed., p. 197.

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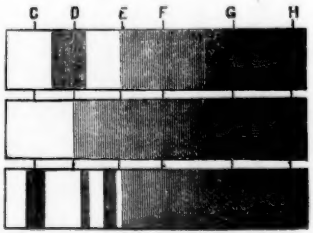
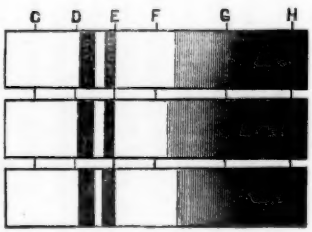
SOLUTION OF BLOOD.	REAGENT.	OXYGENATED.	REDUCED.	REMARKS.
	Caus. Potass			Can be alternated.
	" Ammo			" "
	Alk. Carb.....			Can not be alternated.

HÆMATIN.

these vanished, and the unmistakable pair of reduced hæmatin once more came boldly in view. I was not able to restore the band near C by agitation with air. Those of oxy-hæmoglobin, however, returned more distinct than before. It must have been that the transformation into hæmatin was not complete, and the subsequent manipulation so affected it as to render its spectrum invisible.

This completes the description of the methods which have produced hæmatin in our experiments.

Other reagents are mentioned by authors as determining the formation of this substance. Stokes gives, in addition, acetic and tartaric acids, alcohol, and heat. Dr. Waterman* mentions chloroform. They do not claim for these the same spectroscopic features, but say that the position and number of bands depend upon the agent used.

Thus by acetic acid Stokes describes "four banded acid hæmatin," and by a caustic alkali one band "alkaline hæmatin." Now the "acid hæmatin" was not affected by reducing agents, but being a product of decomposition of the coloring matter of the blood, he called it hæmatin. We have classed it under hæmatoin.

Therefore, instead of calling the results of the action of all the above agents *hæmatin*, it appears a better classification to recognize as this substance only those which by deoxidation show the *two bands of reduced hæmatin*, without special regard to their spectral agreement in the oxidized state, when, according to my observations, they differ with each reagent. The accompanying table will, perhaps, be useful. It illustrates the three varieties described in this paper.

It will be seen from the foregoing table that the spectrum of hæmatin formed from an alkaline carbonate is identical with the spectrum of methæmoglobin (fig. 7, chart). But there is no danger of confounding them when we treat each

* Med. Record, N. Y., Oct. 15, 1874, p. 532.

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with a reducing agent. The methæmaglobin is unaffected, while the other undergoes the change already spoken of.

Hæmatoin.—When either acetic or tartaric acid is added to a solution of blood, or its crystals, in large quantity, the formation of hæmatoin (Preyer), acid hæmatin (Stokes), iron free hæmatin (Hoppe-Seyler), is determined.

The most certain method of obtaining the spectrum of this substance is that advised by Stokes. Take a tolerably concentrated blood solution and to it add equal volumes of acetic acid and ether. Mix well but not violently, for an emulsion will form. Allow the ethereal extract to collect at the top, and, having carefully poured it off, subject it to spectroscopic examination. There will four bands appear (fig. 8, chart), one broad and plain at C, one narrow and very dim at D, a broad and well-marked one at D 75, and the last, broad, with shadowy outlines, at E 70.

We have not always succeeded in seeing the D band, and in order to do so the solutions must be varied regarding concentration, and the light delicately regulated at the slit.

I think the effect of tartaric acid alone is sometimes as satisfactory as the ether solution, and would especially recommend it to reveal the band at D.

Hæmatoin is not capable, like the foregoing substances, of existing in two states of oxidation; reducing agents do not affect it, nor does agitation with air.

Methæmoglobin.—This is a substance found in old extravasations, hydrocele, and ovarian fluids, and a product of the decomposition of hæmoglobin. It was first described by Hoppe-Seyler and named by him. The composition of this substance is not very well understood. It can be prepared in several ways. If a dilute solution of blood is kept for several days at ordinary temperature, or if very *small quantities* of any acid are added to a more concentrated specimen, methæmaglobin will form. These methods amount to the same thing in the end, for in stale blood there are acids de-

veloped, formic and butyric, which give a distinct reaction to test paper.

Examined with the spectroscope, it shows, in addition to the characteristic blood bands (fig. 4, chart), another dark band at C. Treated with reducing agents, these all disappear with the production of the single band of reduced hæmoglobin (fig. 5, chart). This is because the methæmoglobin band C depends upon an acid condition, and our reducing agent being alkaline, destroys it, and sufficient hæmoglobin is present to respond in its well-known manner.

Give the hæmoglobin time to decompose and we shall have pure methæmoglobin, which, according to Preyer*, gives a spectrum similar to hæmatoin. It would seem, then, that methæmoglobin is simply partially-formed hæmatin.

Considerable care is necessary in producing this substance with acetic and tartaric acids. A few drops of a dilute solution are sufficient to bring the C band into view. If a greater quantity is added the blood bands gradually fade, the spectrum at the same time clearing up in *green*, *blue*, and *violet*, and shortly, as in the case where hæmoglobin is allowed to entirely decompose, the four bands of hæmatoin are given. A concentrated solution of blood should be taken to begin with, and never add enough of the reagent to destroy the hæmoglobin bands.

In preparing methæmoglobin by adding acids, the position of the absorption in the orange varies according to their strength. The stronger the acid the farther toward B will the band be situated. By using stale blood and adding an excess of acetic acid the band near C does not shift, but contracts upon both sides (Preyer). We have found nitric and sulphuric acids to be equally capable of the spectroscopic characters of methæmoglobin.

Hæmatoidin.—This is another of the decomposition prod-

* Die Blutkrystalle, Jena, 1871, p. 191.

ucts of the normal blood color, first described by Everard Home in 1830, and subsequently brought to light again by Virchow in 1847. It is crystallizable, and its crystals are easily discovered in extravasated blood of the corpora lutea, apoplexy, sputa of pneumonia, and in obliterated veins.

Hoppe-Seyler† states that this substance is identical with *bilirubin*,* but Preyer‡ asserts that they are distinct, in that their spectra are unlike. This difference can be seen when a chloroform extract of gall-stones is made. We then have a bright-yellow fluid, which before the spectroscope gives no well-defined absorption bands either in dilute or concentrated (bilirubin). On the other hand, a chloroform solution of a apoplectic clot or corpora lutea of the cow gives us a yellow fluid, which exhibits distinct and characteristic bands (fig. 10, chart). Very intense illumination is necessary to show this spectrum.

Leutine.—This is the yellow-coloring principle which is said to exist in the yellow bodies of the ovary, in the yolk of eggs, and, according to Thudichum, in certain vegetables. It is soluble in alcohol, chloroform, and ether, and its solution presents a deciddely yellow color.

Some confusion exists as to the identity of leutine, bilirubin, and hæmatoidin. A chloroform extract of the cow's ovary, we have seen, gives the spectrum of hæmatoidin. We have failed to obtain any satisfactory results in the examination of ovary extracts and fluids from ovarian tumors. Preyer took an ovary in which hæmatoidin crystals were very abundant, and made a chloroform extract of it. Before the spectroscope only the bands of hæmatoidin were seen. But a similar extract of the yolk of egg gave an entirely different spectrum; so this observer holds that the corpora

* Archiv. für Pathol. Anat., u. s. w. Bd. 1, § 383.

† Handbuch der Physiologisch und Pathologisch-Chemisen Analyse. Berlin, 1870, p. 178.

‡ Die Blutkrystalle. Jena, 1871.

lutea contain no leutine, but hæmatoidin. As regards bilirubin, we have seen that it gives no definite bands, and therefore there is no danger of confounding it with either of the above. The characteristic spectrum of leutine is furnished by the extract of the yolk of egg (fig. 11).

Myochrome.—This is the coloring matter of red muscular tissue, and can be extracted by maceration in water. We shall then have a yellowish fluid, which, before the spectroscope, presents all the characters of hæmoglobin; carbonic oxide and other reagents affecting both alike.

BILE.

The color of the bile varies in different animals, and sometimes in the same animal, from a green to a reddish-brown. This great diversity is due to the presence of two entirely distinct coloring matters, *bilirubin* and *biliverdin*. The intermediate tints would naturally depend upon the relative increase of either of these pigments, and produce shades of green and red accordingly. It is on this account that ox bile may be perfectly green, olive, olive-brown, and reddish-brown. Other animals do not furnish quite so much variety in color. Human bile is more or less of a golden-brown, sheep's bile is green, pigs' bile is reddish-brown, rabbit's bile olive-green, dog's bile golden-bronze, etc. It was at one time supposed that biliverdin and the green coloring matters of plants were identical, but Prof. Stokes* proved, by spectrum analysis, that they are not.

It is a favorite and fascinating idea among some physiologists that these bile-coloring matters are derived from the blood—that they are products of the decomposition of hœmoglobin. Experiments on this subject disagree in a remarkable manner.

The most recent and elaborate were performed by Steiner,

* Proc. Royal Soc., 1864, xiii., p. 144.

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in Berlin, and Tarchanoff, of St. Petersburg, who worked in Hoppe-Seyler's laboratory.

The object of the experiments was to determine whether, by injecting water and solutions of blood into the circulation, bile pigment would show itself in the urine. Injections of water were intended to dissolve the corpuscles and set free the coloring matter; blood solutions to supply an excess of the same; in either case to furnish favorable conditions for transformation.

Steiner, in twelve cases with rabbits, injected 10 c. c. of water at 100° Fah. into the carotid arteries; two of these showed bile color in the urine In an equal number of injections in the veins no bile color appeared in the urine, nor did the blood color come through the kidneys. The result of six experiments with 20 c. c. of water was negative. But when from 30–50 c. c. were injected bloody urine resulted, and *post-mortem* examination revealed bloody serum in all the cavities, *but no bile color.*

Tarchanoff thinks that Steiner did not take sufficient precautions, and publishes the result of his own investigations.† He used dogs, considering the slimy urine of rabbits not suitable. He also guarded very carefully against foreign matter, by inserting canulæ directly into the ureters from which to collect the urine.

The animals were freely fed with meal before the operation. A pure solution of hæmoglobin was prepared and injected into the circulation, followed by very evident bile color in the urine. Injected 150 c. c. of water, with a similar result. Steiner, he thinks, must have therefore overlooked these results in his own experiments, or, what is very probable, hares give different results from dogs.

This, then, is a glimpse of the literature of the subject.

It was thought that the spectroscope might throw some

† Archiv. für Anat. and Phys., 1873, ii., p. 160.

light upon the question. But, unfortunately, those who thus examined the bile said that it gave no definite spectrum.

A paper on the "Spectrum of Bile," by Professor Dalton,* in 1874, however, gives a new impetus to the subject; for he has discovered that there is a reliable character in the bile spectrum, which we ourselves, having repeated his experiments, can testify to, and shall proceed to describe.

Professor Dalton first describes the visible spectrum of all kinds of bile as being very short, and terminating very suddenly at or about E 45. He next states that he has found a dark, well-marked band at C. He says: "According to my own observation, it is so constant and so well marked as to form a characteristic feature in the spectrum of bile whenever it has a decided greenish tint, and often when it is of a yellowish, reddish, or olive-brown color. In eleven specimens of ox-bile, sheep's bile, and dog's bile, of a green, greenish-olive, olive, or olive-brown color, this band was visible when examined in a thickness of only two or three centimetres. In all the nineteen specimens of ox and sheep's bile which had a greenish or olive tint, when viewed in a thickness of two or three centimetres, the band at C was very distinct and often quite dark, or almost black. In the three remaining specimens, which were of a yellowish-brown or olive-brown color, it was distinct and sometimes very dark in layers of two centimetres; and in a sixth, it was perceptible in layers of three centimetres"

We have examined nine specimens of ox-bile, six of sheep, one of dog's, and one of rabbit's.

A detailed account is as follows:

Ox Bile.—Specimen No. 1. Brownish-red. Removed from the body one hour. Viewed in thickness of from two to five centimetres, showed indistinct band at C. Spectrum ends at E.

* New York Medical Journal, June, 1874.

Specimen No. 2. Olive-green One hour removed from body. Thickness of from two to three centimetres, very distinct band at C.

Specimen No. 3. Dark green. One hour after removal. Thickness of centimetre reveals exceedingly dark band at C. Spectrum stops at E.

Specimen No. 4. Dark green. One and a half hours after removal. Two centimetres thick gives well-marked band at C. Spectrum terminates at E 50. This specimen is so transparent that the most satisfactory thickness to employ is five centimetres, when the C band is absolutely black and sharp cut at its edges.

Specimen No. 5. Olive-green. One and three-quarter hours after removal. C band visible in layers of from one to three centimetres.

Specimen No. 6. Olive-brown. One hour after removal. Shows no sign of the band at C. Spectrum ends at E.

Specimen No. 7. Olive-green. One hour after removal. In thickness of five centimetres. The C band is distinct. Spectrum ends at E.

Specimen No. 8. Olive-green. One hour after removal. In layers of five centimetres shows C band very plain. Spectrum ends at E 30.

Specimen No. 9. Olive-green. One hour after removal. In layers of four centimetres shows band at C very distinctly.

Sheep's Bile.—The six specimens were all similar in color (dark green), and were removed from the body one hour before examination. In thickness of from one and a half to three centimetres the band at C was in every case very distinct.

Dog's Bile.—Golden-bronze color. Forty minutes after removal. Layer of one centimetre showed C band very dark and well marked at its edges.

Rabbit's Bile.—Dark green, with slight olive tint. Four

hours after removal from the body. Layer of one centimetre reveals C band.

These results, added to Prof. Dalton's, cause us to wonder at the negative results arrived at by previous observers.

The only specimens in which the C band seems to be ever absent are those which have more or less reddish tint. Never in green bile have I failed to see this band (see fig. 12, chart), and it appears from these facts that the band at C is characteristic of the green element in bile. This is shown experimentally as follows: Add nitric acid or tincture of iodine to a specimen of yellow bile which does not show the C band. (These agents oxidize the solution with the effect of rendering the color green.) This specimen will now give the C band. The green color is due to oxidation, and the power of oxidizing substances to strike a green color with bile has been long known, but Dalton has found that if a full and tightly-stoppered bottle of green bile, which shows the band at C, be set aside for twenty-four hours, the green color will fade and give place to an olive or brown, and will then fail to reveal the C band; subsequent exposure to the air, or addition of oxidizing agents, will restore the green color and its absorption band. This behavior is analagous to that of blood when treated in the same way.

Bile also shows several other bands, but which are not constant or well-defined in every instance. These bands seem to have nothing in common with the C band—that is, they appear sometimes in green and sometimes in brown bile. The most constant are a faint broad one on the left and a dark narrow one on the right of D.

Does the fact that bile possesses a characteristic spectrum, then, throw any light upon the question as to the origin of its pigment? Are we able to trace it to any of the products of hæmoglobin? As yet we must answer in the negative. We must await the results of investigation based upon Professor Dalton's discovery.

PETTENKOFER'S TEST FOR BILIARY SALTS.

As is well known, this is a color test. It depends upon the solution changing to a fine purple. But it has been found that there are other substances which, by treating with cane sugar and sulphuric acid, will present the same color. Such are various albuminous bodies, the salts of opium, theine, ethereal oil, cerebric acid (thudichum), amyl, alcohol, etc. But the spectroscope will decide whether the colored reaction be due to either of them or to the bile salts.

The purple reaction characteristic of Pettenkofer's test is usually too concentrated, even in very thin layers, for spectroscopic analysis. Water added with a view to dilute it only renders it still more opaque by precipitating cholic acid. But it has been found by Professor Dalton* that if a very dilute watery solution of the sodium glycocholate (1–500) be taken to begin with, subsequent dilution with water will not cause a precipitate. Therefore it is well to use very dilute solutions of the suspected substances, if they are to be placed before the spectroscope. (Should it be necessary, sulphuric acid may be used to effect the dilution.)

Pettenkofer's test in watery solution shows one broad and distinct band at E, the refrangible end of the spectrum being invisible up to G. In alcoholic solution the same band at E is seen with another, not so broad, at F. Egg albumen, treated with Pettenkofer's test, shows a broad, shadowy band, commencing at about D 60 and extending to F. The spectra of codeine and morphine are the most like that of the bile salts, showing a band at E; but this band is not near so well defined, and disappears suddenly on the addition of a small quantity of water, while in the case of the latter a considerable dilution is necessary to destroy it.

URINE.

It was expected that the spectroscope would reveal some

* Human Physiology. Philadelphia, 1875, p. 214.

positive information as to the origin of the coloring matter of the urine, but it is found that this fluid does not yield any satisfactory results by prismatic analysis. Ordinary urine shows no absorption bands at all, and a specimen which I evaporated from 30ʒ to 5ʒ, thereby causing it to present a very dark reddish color, still gave a negative result. But by adding nitric acid, and allowing it to stand, I have once succeeded in getting a broad, distinct band at F. This band has been seen by other observers, and because the urine sometimes shows it, there is a theory that urochrome is derived from the bile colors, in that by extracting dog's bile with hydrochloric acid we obtain a substance which gives a very similar band. Further treatment of urine and the bile extract bring about other spectral changes which give strength to the theory just stated (Sanderson).

Coming now to inquire into the practical worth of spectroscopic analysis, we are reminded that there is not such a distinction to be made between the two terms, "scientific" and "practical," as is generally accepted. The fact is we never know how very practical a very scientific discovery may at any moment become. It was a scientific course of experiments which preceded the practical use of electricity. The investigations of Goodyear and others into the properties of India-rubber were strictly scientific, and led to the most practical results. And so of almost every useful invention.

Now, physiological spectroscopy is in its infancy, and we may reasonably look for important practical results within the near future. Let us see what it has already accomplished. Stokes's experiments have materially added to our knowledge of the respiratory processes, showing conclusively that the function of the red coloring matter of the blood corpuscles is to absorb, convey, and deliver oxygen; that the difference in hue between venous and arterial blood is due simply in the one case to the absence, and in the other to the presence, of oxygen.

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But it is in the field of forensic medicine that we shall find the spectroscope of absolute use. The detection of blood by the microscope depends upon the presence of the corpuscles. But these elements are very easily dissolved or otherwise rendered unnatural. Here the microscope would fail, but the spectroscope will reveal reliable signs, as we have seen that even the decomposition products of hæmoglobin give characteristic spectra.

Specimens of blood, wet or dry, kept for long periods, undergo changes which render the microscope useless as a means of detection; but spectroscopically the presence of blood can be absolutely proved. For instance, dried blood (on rags, wood, glass, etc.), kept for some days, turns brown. It is practically insoluble in water, and in order to subject it to examination we must dissolve in a weak acid. This at once destroys the corpuscles, and the microscope is valueless; but by prismatic analysis we see the two hæmoglobin bands, and, in addition, one at C. It is either methæmoglobin or hæmatoin. Treatment with reducing agents will determine which, and absolutely prove the presence of blood. The broad band of reduced hæmoglobin will appear if it is the first; if the second, they will have no effect. Letheby and Sorby examined stains on linen seventeen years old, and the spectra were in every respect characteristic. We have a specimen of pure sheep's blood which has been kept at ordinary temperature more than a year. The corpuscles have disappeared, it is swarming with infusoria, and the microscope can furnish no proof that it is blood, examined as it stands; yet it shows the absorption bands of hæmoglobin, and reacts perfectly well with deoxidizing substances. Benoit* speaks of a similar observation. Sorby kept dried blood (on rags) exposed to the air, and found that it was converted into methæmoglobin with different degrees of

* Etudes Spectroscopiques sur le Sang, 1869, p. 60.

rapidity, according to the locality. In towns and in inhabited rooms the change took place sooner than in the country well removed from houses. He also found that dried stains sealed in tubes required three months to change; if sealed wet they did not change at all. (Cited by Letheby.*)

Some vegetable and animal coloring matters may confuse us at first, but the application of oxidizing and reducing agents will give conclusive evidence of the presence of blood.

Substances most likely to be confounded with blood-color are, an ammoniacal solution of carmine and solutions of iron sulphocyanide. These, when placed before the spectroscope, show such different absorption as to enable one readily to distinguish them from blood and from each other. An important test for vegetable colors is ammonia. I believe there is not an instance where this reagent does not markedly change the hue, while it has little or no effect upon blood.

Regarding the question, Does prismatic analysis enable us to distinguish human blood from that of the lower animals, the answer is, It does not. The spectrum is alike in all red blood. (Hoppe-Seyler, Valentine, Bert, Benoit.)

The presence of other coloring matters does not interfere with the detection of blood. I have found that one drop of blood added to an ounce of green ox-bile gives its characteristic absorption very distinctly.

It is sufficient to call attention to what has been said of the action of gases and poisons upon blood to show how important the spectroscope would be in cases of death from any of those substances. With some of them it would be the only means of determining the cause of death, while with others it certainly would greatly strengthen the evidence adduced. The delicacy of this method of examination is very great in the case of blood.

Sorby states that 1-100th of a grain could be made to show

* Spectrum Analysis. Reports, London Hospitals and Clinics, 1866.

all transformations, and he says that by a little practice 1-500th or 1-1000th of a grain can be detected.

It is further said that with the Sorby-Browning micro-spectroscope a single blood corpuscle will show the characteristic absorption. Indeed, the first recorded case of the use of the micro-spectroscope in a murder case is where the suspected criminal was near being acquitted on account of the failure to establish the proofs that there were any evidences of blood upon a hatchet which was found in the woods near the victim, and with which, from the character of the wounds, it appeared he must have been attacked. The implement had lain exposed to the weather several weeks, and the most careful examination failed to discover the slightest traces of blood until it occurred to the expert to remove the handle. Then, upon the end which was inserted into the iron ring, a dark, reddish stain was seen. Careful sections of the wood were made, the stain dissolved in a few drops of acidulated water, and, with a 1-25th inch objective on the micro-spectroscope, this fluid showed the indisputable blood bands, and the prisoner was convicted.* Herapath † estimates that there was about 1-1000th of a grain of blood in the portion examined.

In conclusion, let us say that this is a strikingly beautiful means of investigation; it is free from the objections which chemical analyses of the coloring matters offer, viz., numerous apparatus and reagents. With coloring matters other than blood, I think its chief value, at present, is in verifying other analytical methods. But we hope by improved illumination and construction to enlarge its field and render its use even more valuable.

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* Mountain-Ash Case. Reg v. Robert Coe, Swansea Spring Assizes, 1866.

† Herapath "On Use of Spectroscope and Micro-Spectroscope in Discovery of Blood-Stains," etc. Chemical News, xvii., English edition, No. 431, pp. 113 and 224.

ART. II.—*What is the Essential Nature and Purpose of the Fever Process in Living Human Bodies?* Delivered at session of Muskingum County Medical Society, held in the City of Zanesville, Ohio, June 8, 1876, by Z. COLLINS MCELROY, M.D., one of the Physicians to the Muskingum County Infirmary; Physician to the Home of the Friendless; Fellow of the Zanesville Academy of Medicine; Member of the Muskingum County Medical Society, of the Perry County Medical Society, of the Licking County Medical Society, of the Meigs and Mason Academy of Medicine, etc.

Until there is some generally, perhaps it were better to say universally, accepted doctrine of fever to serve as a basis, it does not seem to me that any particular type of fever can be very profitably studied by itself. That such a doctrine does not exist is not due to a lack of consideration of the subject in the past by at least some of the very best cultivated minds in the profession during many centuries; for the existing literature in the English language alone on fever and fevers would absorb in its bare reading the bulk of an effective life, even if protracted beyond the average of duration. They have, in all their various phases, been studied patiently, diligently, and, as I believe, exhaustively from an objective point of view. No investigator, as an observer simply, can hope to become the discoverer of new facts from this point. The subject, as presented by the literature of the profession, is excessively complicated with specificities, classes, genera, species, and varieties of type and form of a process which, in the nature of things, is in itself a unity.

Future study will certainly present novelties in simplifying its existing complexities, for it seems to me that these complexities are all of human invention, and have no existence in nature or fact. Much of the current views of fever in the professional and popular mind are the products of men's imaginations in the theological era of human history. With none of the facts of physical science in our day to guide investigation into the essential nature of the fever process in living bodies, it came to be regarded as essentially the work of the devil and in the interest of death. Fever

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or fevers have, therefore, all along through the past, and up to the present moment, been regarded as enemies, and the whole array of "drugs and medicines" leveled at them with a view of arresting them, or "stamping them out." With the facts brought to light in our day by physical science, this doctrine can not be maintained—will not bear investigation. All remedial measures aimed at annihilating them have failed, and will continue to fail on indefinitely forever. Nature's work is not convulsive, but by the slower processes of evolution. I say, therefore, that these convulsive efforts at stamping out fever have failed, with the apparent fact before me of the arrest of certain types of fever by bark or its alkaloids. The arrest of any given case of periodical fever is by no means a certainty, before hand, by bark or its alkaloids. The failures of bark to do this are quite as conspicuous as its successes or apparent successes; for it seems to me that in the bulk of cases, even where the fever is apparently arrested, that it is so, in fact, only so far as the work of a fever process has been finished at the time of its interruption; for relapses and return are the rule, and complete restoration to health the exception, until after the purposes of fever have been accomplished. I have, as all of us probably have, had repeated failures to arrest fever by bark or its alkaloids, and patients refuse to take it longer because of its failure to cure them.

Our own great Doctor Rush declared nearly a century ago that there was but one fever; and that the attempt of nosologists to map them into orders, genera, species, and varieties was no more successful than an attempt to map and describe the ever-changing forms and types of clouds in the firmament on a windy day. And he lived in the day when the methodical division of fevers of the Edinburgh school, exemplified in "Good's Study of Medicine," held complete control of the professional mind of the world, or, at least, the English-speaking world. But nosology is now no longer cul-

tivated in the medical world. On the contrary, the very latest authorities, conspicuous among them Stokes, of Dublin, in his just published "Lectures on Fever," tells us to study the resemblances of different types of fevers to each other, and not the differences between them; that they are correlative, that is, naturally convertible into each other's types, and instances the interchangeability of typhus and typhoid, etc.; but, above all, study their "periodicity," by which, it seems to me, he means their course and duration.

The problem of fevers now is, "What is their essential nature?" Are the phenomena presented by living beings, known as fever, in the interest of life, or are they in the interest of death? For whoever solves this problem for himself masters the subject for the purposes of the actual working practitioner at the bed-side If these phenomena are in the interest of death, the war on them, using the whole available materia medica as ammunition, should go on, despite the failure of the enterprise during so many centuries in the past. But, from sheer exhaustion in our day, the war on typhoid fever has ceased, or mainly ceased, and the best and most successful remedial management is that known as "expectant"—to do nothing where there is nothing to be done.

What, then, is the essential nature of a fever, regarding all the types of fever, for the moment, as a unity? For if the purely imaginary factors of specific differences, as regards causation, variations of phenomena, and terminations, be admitted in the equation, no result which will include all the factors concerned is ever likely to be reached. In approaching the study of this problem every assumption must be dropped out of consideration.

There are, in fact, so far as observation and experimentation have been able to identify, only two modes by which the occasion or necessity for a fever process in a living body may be brought about, viz., from material introduced from with-

out, "storing up force" capable of modifying the processes of repair and waste of tissue, and, as a result, modifying the dynamic capacities of the tissues, presenting, when these modifications of structure seriously impair function, the alternative of their removal by a fever process, and reconstruction from new material, or the death of the individual; the other, by material produced within the living body, partly by modifications of external conditions of force (meteorological changes), which, failing to be eliminated or rendered harmless by chemical decomposition, modifies the processes of repair and disintegration of tissues, resulting in modifications of their dynamic capacities or normal functional capacities, with the alternative of their gradual removal by a fever process and reconstruction from new material, or death of the individual.

The evidence I have been able to obtain by observation bearing on the causation of typhoid fever, places it, in the bulk of cases, in the latter category, viz., the causation being generated in the body of the sufferer, though not universally. While the whole catalogue of so-called specific or eruptive fevers, including typhus, syphilis, whooping-cough, gonorrhœa, etc., are as clearly in the first class in the great bulk of instances, though, it seems to me, that what are called "epidemics" do not receive satisfactory explanations from this cause alone. All these special types, as they are called, had a beginning, not from contagion, which might, with similar conditions, be repeated, and hence arise *de novo*, but in the main thing are brought about by external causes, viz., material storing up force, which, introduced into a living body, modifies the processes of repair and waste of tissue, resulting in like loss of dynamic capacities, necessitating a fever process for removal and reconstruction from new material, or death of the individual. Instances of death at the beginning, or prior to the beginning, of a fever process are seen

in the so-called cold plague, pernicious remittents or sinking chills.

The whole train of phenomena of a fever, its causation, progress, and results, brought about by circumstances altogether within the control of the observer, and at almost any time can happily be studied in the expedient of vaccination. It seems a very simple thing, and so it is, but its very simplicity conceals its importance, and effectually prevents recognition of its lessons in the study of the essential nature of fever. Were it an exceptional phenomena of rare occurrence, it would receive more attention.

The train of phenomena brought about by the act of vaccinating an unprotected person embraces in itself every thing connected with a fever process, no matter what its cause, type, symptoms, or duration; for, in the progress of the *vaccine disease*, so called, in different individuals, and under different circumstances—external conditions, and conditions of bodies at the time the virus, so to speak, is introduced—there is no want of resemblances to all other types and forms of fever recognized in the literature of the profession, including various sequesla and occasional death.

In vaccination there are—

1st. The introduction of a so-called "virus," composed of materials natural to living bodies, but differing from any natural compound in its peculiar chemical structure, which stores up, in virtue of this peculiar chemical structure, a mode of force which, though wholly inoperative elsewhere in nature, in a living body modifies the natural processes of repair and waste, or construction and disintegration of tissue, and of the molecular arrangement of the materials of structure of living human bodies, in such a manner that a repetition of the phenomena is in many cases impossible through life, though not all.

2d. The stage of incubation, as it is called, the time required to modify tissue, and the materials of which future

tissue, in part, must be formed, existing in, or introduced into, the body, after the introduction of the virus, so that function is impaired, and the fever process set up for its removal and reconstruction in the modified manner, that a repetition of the same process can not be repeated through life.

3d. The decisive failure of function announced by chilliness, cessation of appetite, which is the demand for new material, succeeded by elevation of temperature, the fever process varying somewhat in different individuals in intensity, course, and duration.

4th. Stage of convalescence: a removal of a demand for new material, announced by return of appetite, gradual resumption of function, as the reconstructive processes are completed, and, with many exceptions, as occasional permanent damages to structure, or even death itself, a return to apparent or real condition of health. The result—immunity from the effects of the virus which produced the fever, as well as from the effects of a still more active virus, smallpox, sometimes for life; in other instances for longer or shorter intervals; in others, again, to be susceptible to their effects, but in a mode greatly modified in intensity and duration at all times.

A careful study of these consecutive phenomena really uncovers whatever secrets there are to any of us in the fever process, and supplies the matter for a more or less truthful and trustworthy answer to the question, What is the essential nature of the fever process in human bodies? Is it, in its purposes, conservative, and in the interest of life? or is it in the interest of death? In other words, is it the work of the devil?

It must be noticed that in vaccination the mischief to structure takes place before the algide shock—chill—which is the unmistakable announcement that a more or less serious disturbance to structure has already taken place, here as

well as in other forms of fever, often with an apparently local point suffering more seriously than the remainder of the body. This local point is where the changes of structure have progressed to the extent of bringing it within the scope of human observation, sometimes with the naked eye, at others to the assisted eye. In vaccination the local point is very plainly visible to the unassisted eye of the observer. If there is no fever process set up for the removal of tissue, modified so as to seriously impair function, then there is speedy death, as with so-called pernicious fever; or apparent recovery takes place, with some permanent alterations of structure, to be known henceforth during the life of the individual as some incurable chronic disease. But the fever process being set up, a more or less rapid or gradual combination or removal of the modified structure goes on, and a full recovery may take place if the capacity to reproduce natural structure from new materials has survived in the midst of the molecular changes of structure. This capacity resides in the structures themselves, for it is one of the harmonies of organic nature that the main purpose of all life, animal or vegetable, is to provide its own preservation, reproduction, and multiplication from new material, as seen in its simplest form in a vegetable seed. We say wheat is ripe when the grain is perfect; that is, when the plant has provided the means for its reproduction and multiplication in a seed the parent plant is dead. Wheat ripe, wheat dead; its mission in organic life finished.

So, in the act of functional decay of the various organic structures composing an individual living body, each special kind stores up the force, in the necessary material, for its own reproduction from new material. For the separation of this peculiar material, this seed of the structures, so to speak, from the general débris of the tissues, and its restoration at a proper time and place to the circulation, with new material, to enter upon its work, there exists in all complex

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animal existences a complicated and widely distributed apparatus called the lymphatic system. The lymph, as it enters the blood current near the right auricle, is the seed of the structures, from whence it has been derived.

Now, if the capacity to store up the force for their own reproduction from new material has been lost by any of the structures, or the lymphatic system has shared the same fate, so as to incapacitate it for the performance of its function by any means, be it virus, malarial, chemical, or mechanical, the inevitable result is death.

And so, if the damage to any given structure be so great, previous or subsequent to the lighting up of the fever process, that it can not provide or store up force for its own reproduction from new material during a fever process, if death occurs it is said to be due to some lesions of this particular structure, be it enteric glands, as in typhoid fever, or stomach, or brain, or nerve masses, or wherever there is a failure of structure, as definitely announced by loss or important modification of function, be it called inflammatory, softening, or any other of the fanciful names given to appearances by pathologists.

It seems to me the conclusion can not be resisted that the essential nature of fever is conservative, intended to remove structure, tissue which has lost its physiological or natural dynamic or force-producing capacities; for in its decay by the fever process the principal dynamic result is heat, to which may be added, as an occasional result, an exaggerated or distorted imitation of natural function, as delirium, spasms, pain, etc., and by these means save the life of the individual. In most cases called severe, a large part of the tissues existing at the commencement of the fever process disappear before convalescence is complete.

With this understanding of the essential nature of fever, the pathology becomes transparent enough for any of us to understand; for if there were no spoiled tissue, so to speak,

to be consumed, burnt up by the "burning disease," the fever process, there would be no necessity for a fever process, and none would occur or take place. And the bulk of the mischief to structure has already occurred prior to the commencement of all fevers, just as it was seen to be after vaccination and before the fever process was set up. The modifications or changes of structure are antecedent, the fever process the succeedent, and in its purpose and nature is essentially conservative in the interest of life, and not the work of the Evil one. If there were no failure of function on the part of any of the structures of a living body, there could be no antecedent alterations of structure, and none of us could ever know we were sick, in fact never could have a fever.

Whoever would manage fever, clinically, must study and comprehend its nature, course, and possible and probable results, if he desires to be useful to the sufferer. The actual working practitioner must bear in mind constantly that the fever process is not the work of an enemy, but that of a friend to the life of the individual; that its end is salutary, though death may take place, apparently, as a result. But death would occur without the fever process in such cases, and it would then figure in mortuary statistics as some form of "heart disease," or "brain disease," or "hæmorrhage," or "blood poisoning," or "bowel complaint," etc.

In the remedial management of fever cases, it is well to keep constantly in mind that it is not necessary to be pouring "drugs and medicines" into bodies of patients all the time; that the main duty of the physician is to watch and wait, and do nothing until there is something to do. It may be that the fever process is taking place too rapidly, as evidenced by high temperature and accompanying rapidity of blood circulation, adding no little to the danger in which the suffer is already involved. There are ample means for slowing speed. Never forget that effete matter, matter unfit for the further purposes of life, is accumulating in the body

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exactly in proportion to the rapidity of the process of combustion, and as measured by the heat evolved, which, if retained, will certainly add no little to the trouble already in existence, that is, give rise to additional pathological changes of structure. I think it may be stated as a rule from which there are no exceptions whatever, that the human body has no enemy in nature so formidable as the results of its own decay, not only in health, but in sickness, where the danger is multiplied many times. It is, therefore, of the first importance to ascertain, at short intervals, that it is actually evacuated as rapidly as it is forming. This evacuation will occur in the gaseous forms principally at the lungs, though some vapors will escape there; the liquid at the skin and kidneys, the latter the urine, holding in solution by far the most noxious material escaping from the body, because in the laboratory of the body this material, excessively complex, is not, and probably can not be, reduced to simpler chemical conditions, or gaseous states, safely; and something scarcely less noxious will escape from the rectum and bowels. If nature, however, is doing this work well in any case whatever, we, as physicians, should withhold our hands of interference. If she fails, study attentively in what, and the mode of failure, and by our art and the "stored up force" at our command in medicines, imitate, as far as may be, her natural processes. Do not go beyond, or thwart nature, if her motives are not clearly malevolent, as they would be in blood escaping from a severed vessel.

I read many reports of cases in journals, and hear them reported in societies, in which, it appears to me, the cases are made as they progress, by unwise or needless interference, or total neglect of interference on the part of medical men. I think natural evacuations should be interfered with with great caution. Modern pathologists speak of the caseous or tubercular deposits, so called, almost always found in post mortems after fatal cases. These are doubtless effete mate-

rials which crystallize for want of water to hold them in solution. The water supply is, therefore, of the very first importance, far more so, in the bulk of cases, than "stored up force" in "drugs and medicines."

Watching, waiting, regulating of necessary speed; getting rid of the débris of the wasting structures, imitating nature as near as can be, observing the utmost promptness in clearing away from the person, and out of the room, material escaping from the body; in a word, enforcing the utmost cleanliness, are the prime duties of the medical attendant.

If the patient is to recover, the tissues have to be reconstructed from new material, to a greater or less extent. This material must be supplied; therefore food, in such states as to be used by the body with the least expenditure of force in its reconstruction, is one of the most important features of professional management of fever cases. In small quantities, and frequently repeated, best suits the diminished powers of assimilation always existing in every fever patient; and milk, because it supplies every article needed by a body in health, stands first on the list, but not to the exclusion of other things.

With such knowledge of the beginnings, aims, progress, purposes, and ends of the fever process, it seems to me none of us can fail to be less bewildered during the progress of any given case, and every case, than I was when I regarded the fever process as the work of an enemy—the Devil—which I certainly did in the commencement of my career, thirty years ago. This is the popular conception now; and judging from the literature of the profession, it still lingers in the minds of those who occupy positions to lead the professional mind of the world.

The conclusions to which my clinical studies of fever have led me may be stated somewhat as follows:

1st. That before a fever process of any type or form can

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occur in a human body, there must be some antecedent modification of the dynamic capacities of structure.

2d. That these alterations may occur from internal causes, that is, from material acting as a virus, formed in the body, as in many cases of so-called typhoid fever, but not all.

3d. That these alterations may, and in fact, in the bulk of fever cases, do occur from material—gaseous, fluid, or solid—introduced from without, which acts by modifying the processes of repair and decay of tissue, resulting in modification of force-producing properties; as well as by external conditions, as meteorological changes, etc., acting in a somewhat similar manner, and with like results.

4th. That the fever process in a human body, irrespective of type or cause, is a conservative process, in the interest of life, removing, by the slow process of combustion or chemical decomposition, structure which has either wholly or partially lost its physiological functional capacities; and its reproduction from new material, with physiological functional capacities, sometimes, and in the bulk of cases of so-called eruptive fevers, so modified as to be incapable of being disarranged to the same extent by a like cause through life, *i. e.*, self-protective against second or repeated attacks, so called.

ART. III.—*A Report of three Cases of Exophthalmic Goitre, with Remarks upon its History, Ætiology, and Treatment.* By W. R. THOMPSON, M.D., of Vandalia, Ohio. Read before the Montgomery County Medical Society.

It will not be my purpose in this paper to enter into a close examination as to whom may be due the credit of first directing the medical profession to this remarkable disease. Prominent among those whose names are associated with the early study of exophthalmic goitre are Graves, Basedow, Stokes, and Bigbie.

Prior to 1835, Graves recognized the leading symptoms in three cases, describing them under the title of functional

diseases of the heart. He subsequently recognized and taught the disease as a distinct morbid entity; however, not until some three years after Basedow had published his concise tablet of symptoms. To this was soon added the clinical testimony of Stokes and Bigbie, who more accurately described and recognized the exophthalmos and goitre as making up the morbid trio of symptoms characteristic of this disease. Exophthalmic goitre is known and described under various titles. Trousseau prefers to characterize it as Graves's disease. Virchow objects to this nomenclature, inasmuch as Graves looked upon the palpitation of the heart and goitre as essential symptoms of hysteria, while the exophthalmos is scarcely mentioned; while to Basedow he attributes the credit of first describing it as a distinct and separate disease. Virchow has adopted the name of struma exophthalmica as more clearly expressive of the ætiology of disease.

The essential symptoms of exophthalmic goitre are functional derangements of the heart, enlarged thyroid gland, and prominence of the eye-ball; to which may be added a peculiar and characteristic vibratory thrill throughout the whole arterial system. Of this "tetrad" of symptoms the first and fourth are always present; without the cardiac and vascular derangement the disease would have no existence. The exophthalmos and goitrous enlargement may be absent and still the disease exist as a morbid entity; but to exist in its typical and characteristic form presumes an association of all the features above named. It is not unusual for there to be found *pari passu* with the disease a second order of symptoms, namely, anæmia, chlorosis, diseased liver and organic heart disease, hypertrophy, dilatation, and passive aneurisms.

The cardiac trouble in exophthalmic groitre consists in the increased number of its beats; the action of the heart is constant and unintermittent. In an ordinary case the heart presents no appreciable lesion, perhaps a slight enlargement,

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the enlargement being a true physiological hypertrophy, occasioned by the exaggerated action.

Should anæmia be present the result would be dilatation and passive aneurisms, from a weakness of tissue structure. Dr. Aran has stated that there were always enlargement of the heart in exophthalmic goitre, but this is not substantiated by the observation of other authors. There may be simply dilatation of the chambers of the heart, without hypertrophy of tissue. This disease, primarily, does not depend upon a diseased heart; it does not have the same history or ætiology which characterizes organic heart disease. It may attack individuals having endemic goitre, and others with organic disease of the heart; in those cases the diagnosis would be very much obscured. It will be readily seen how, in time, the turbulent action of the heart, beating from one hundred and twenty to one hundred and fifty to the minute, will result in vascular and structural lesions in a patient whose heart is already in the stage of incipient change, or be auxiliary in the morbid process already set up in a hypertrophied gland. Should there not be a tendency to organic disease of the heart in a patient with a well-marked case of exophthalmic goitre, the heart will, in time, invariably suffer. At first the disturbance, which is merely functional and dependent upon the disease in the nervous system, will, from the accelerated action of the organ, result in dilatation and hypertrophy. The dilatation may be general or simply confined to the left chamber.

The most remarkable feature in exophthalmic goitre is the prominence of the eye-balls. They have the appearance of being enlarged, but are not. Perhaps there is a slight increase of the vertical diameter, and a corresponding decrease of the antero-posterior diameter, caused by the hypertrophied cellulo fatty tissue of the orbit. The vision in most cases is very little impaired; in other cases, however, there exists anomalies of accommodation and refraction.

The exophthalmos is primarily caused by congestion of the blood vessels of the orbital tissue. The fatty tissue, receiving the superabundant arterial flow, will increase to such an extent, in some cases, as to force the balls of the eye forward upon the verge of the orbit, and will require compresses to retain them. This prominence of the eye-balls in this disease usually will cause, in the patient, the gravest apprehensions. The exaggerated action of the heart can be concealed, but the exophthalmos is a standing advertisement of their afflictions; they are certainly entitled to the commiseration of the true physician, inasmuch as they at once become the mark of quacks and charlatans. Hyper-medication is almost unavoidable. Of the three prominent symptoms in exophthalmic goitre, the enlargement of the thyroid glands will receive the least consideration in making up the diagnosis, on the account of the frequency of endemic goitre in women.

The usual phenomena presenting in this locality will consist, first, in a vascular congestion, which will in a short time be replaced by a permanent hypertrophy. The thyroid arteries will enlarge, and, with the carotids, will pulsate violently under any nervous disturbance, giving to the neck a peculiar and characteristic appearance. Exophthalmic goitre is not essentially a chronic disease. Two forms have been described by authors, the acute and chronic. The acute may come on suddenly, and, from the exaggerated action of the heart, endanger life. Among the secondary order of symptoms observed in this disease are anæmia, chlorosis, hypertrophy of the cranial bones, cirrhosed liver, amylaceous degeneration of the kidneys, and valvular and structural disease of the heart. These symptoms are found generally in the advanced stages of the disease.

The ætiology of exophthalmic goitre, in the present state of our knowledge, is not well understood; however, the general disturbance of the nervous system would seem to point

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to some primary blood poison expended upon the great sympathetic system of nerves, that being the division which primarily suffers, giving rise to the phenomenon of local congestion. Graves and Stokes think a common cause is sudden fright. The most powerful predisposing cause, however, is sex. Out of fifty cases reported by one author forty-two were women and eight men. Among the females the time of attack was between the ages of eighteen and thirty years, a circumstance which points to disorders of menstruation as a prolific cause.

The pathological condition which presents itself in Graves's disease, as has been already pointed out, is essentially neuropathic, presenting the strange phases of local congestion. The proximate cause of this congestion is a modification of the vaso-motor apparatus.

Differential diagnosis: There is no disease which can possibly be mistaken for exophthalmic goitre when all the symptoms pointed out by Graves are present. Its sudden or insidious invasion; its distinct and frequently recurring paroxysms of variable duration, presenting the three characteristic symptoms of exaggerated action of the heart, prominence of eye-balls, and enlarged thyroid, together with the vibratory action of the vessels, will all point, if carefully considered, to a correct diagnosis.

Although the prognosis is serious in a large proportion of cases, a patient will occasionally, after a lingering illness, suddenly change for the better and make a speedy recovery.

Treatment.—The treatment is very unsatisfactory in the great majority of cases. However, the indications for treatment would be first to regulate the turbulent action of the heart, build up the disordered condition of the nervous system, and subdue the tendency to local congestion. The so-called nervines have little or no effect. The preparations of iodine, which were very much in vogue, are of no value, and may do

harm if given in the active stage. Iron has also been prescribed, with a view to modify the diseased action in the nervous system, but with little or no good, unless where there exists an anæmic condition. The primary neurosis, according to the best observers, is best treated with belladonna and bromide of potassa, the palpitations of the heart with veratrum viridi and digitalis, together with a general invigorating course, with correct hygiene. As there are no specifics, each case will suggest its own course of treatment. Ergot has been suggested, from its known effect upon the capillary circulation.

CASE No. 1.—Miss B., æt. 25, consulted me in the spring of 1868 for a severe cough; complained of pain in throat and lungs. She coughed almost incessantly, expectorating very little. Physical exploration revealed no lung difficulty of any magnitude; pain in the chest perhaps the result of coughing. The pulse ranged from 100 to 140 to the minute; was extremely nervous. Otherwise she presented the appearance of perfect health. After quite an extended treatment no amelioration of the symptoms was manifest. The exaggerated cardiac action and cough were constant. The patient now passed into the hands of other physicians. In about eight months she again presented herself, having found no one who could tell her what the matter was to her satisfaction. It was during this period that the three symptoms of Graves's disease became manifest. The following appearance presented itself: The physiognomy had a savage and strange look; the eye-balls were very prominent, and appeared to be on the verge of escaping from the orbits; the thyroid gland was enlarged; the veins of the neck were very prominent, and pulsated with each pulsation of the carotids beneath them, giving to the neck a peculiar appearance; the cardiac action was excessive, ranging from 150 to 175 per minute; the pulse at the wrist was almost imperceptible; she was extremely nervous, and troubled with paroxysms of dysp-

nœa and painful palpitation. The heart gave no evidence of organic disease, although there was a marked difference between the carotids and the radial arteries, the former being full and vibrating, the latter weak and compressible. Vision perfect; complained of unsteadiness in walking, more especially when she ascended and descended to and from her chamber. At this last examination of the patient, Drs. J. D. Kemp and H. B. Nunemacher were present, both coinciding in the diagnosis of exophthalmic goitre. The patient was treated by us for that disease for a period, perhaps, of two years, during which the symptoms would partially subside, and convalescence seemed to be assured. The patient would share with her physicians in the hope of a speedy recovery, but was doomed to be as often disappointed by an aggravation of all the symptoms. The patient again passed from our observation, the family having removed to a distant part of the State; have since learned, however, that she still retains the prominent eye-balls and exaggerated heart action, but not nearly so bad as during the second year of the trouble. The heart never appeared to suffer in its organic structure from the excessive action.

Case No. 2.—Was called to see Mrs. S., æt. about 50 years; found her suffering with paroxysms of dyspnœa, and painful throbbing of the arteries and palpitation of the heart. The patient's physical appearance was that of one distressed in mind and emaciated in body. Pulse ranged from 100 to 140 per minute. My attention was directed to a violent pulsation and throbbing in the region of the abdominal aorta, confined to a space of about three inches, immediately above the iliac bifurcation. My first impulse was that I had a case of aneurism, but failing to find any well-defined tumor, was at a loss to determine the cause. The patient grew worse as each paroxysm succeeded the other. A consultation was had with Dr. J. C. Reeve, of Dayton, who was

inclined to the belief that there was an aneurism, though unable to detect the tumor. A few days later, we again saw the patient—Dr. J. C. Conkling present. After a fruitless search for an imaginary tumor by us all, it was suggested by Dr. Conkling that perhaps it was due to nervous influence, to which opinion we were inclined to agree—the subsequent history of the case proved the entire correctness of the opinion. The disease still progressed, all the early symptoms being more or less intensified. About the middle of her illness, which lasted for about three months, the exophthalmus, made its appearance in its characteristic form. I was no more in doubt as to the diagnosis. The thyroid gland was very little affected. This patient made a good recovery, except she still retains the prominent eye-balls. The throbbing was so violent at times that the bed-clothing would be raised with each stroke of the heart. This patient imagined she had two hearts. Judging from external appearances, her opinion was not to be wondered at, so nearly did it resemble the heart action.

CASE No. 3.—Miss S., æt. 25 years, daughter of patient number two, was taken sick, soon after her mother's recovery, with intermittent fever, which returned at intervals. This trouble was soon superseded by a general disturbance of the nervous system, with dyspnœa and palpitation of the heart. The carotid arteries beat violently, giving to the neck and thyroid gland, which was enlarged, a pulsatory appearance. The exaggerated heart action was soon joined by the other prominent symptoms of exophthalmic goitre. The eye-balls became very prominent, so much so as to occasion in her the gravest alarm lest they should escape from the orbits. The thyroid glands enlarged presented a beautiful case of this disease. It has been about four years since the first symptom appeared. She was treated by me for about one year, during which time she would rapidly convalesce under treatment. Again the attack would be renewed, dyspnœa and

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palpitation would appear, after which a tedious recovery would supervene, but never so as to be free from the symptoms of her old complaint. She subsequently became the patient of as many different physicians as there were points of difference in the symptoms of her disease. She took up her abode in doctor's offices and drug shops, but all to no purpose; she regularly has the paroxysms of palpitation and dyspnœa. Her stomach, no longer able to digest the nostrums which had been showered into it, gave way, and would neither retain nourishment nor medicine. Her heart beats from 120 to 150, full and strong, without any irregularity, but with a marked bellows murmur over the apex. She would fall away in flesh at times to a mere skeleton, then again bloat up as in general dropsy. The patient has all the secondary order of symptoms, and is perhaps incurable.

JUNE 23, 1876.

ART. IV.—*A New Device for securing Union in Staphyloraphy, Vesico-vaginal Fistula, etc.* BY A. SCHEIBENZUBER, M.D., Dayton, Ohio.

As we all know, the practitioner often fears to attempt an operation in cases of fissured palate, from the fact that, even with the greatest skill and care, such operations frequently fail of success. Those who have read the text-books on the subject are already aware of the multitude of instruments, and the various modes of operation which have been devised for the cure of cleft palate—almost as many methods as cures. It is not the object of this paper to multiply, but on the contrary to endeavor to diminish the number of these appliances. I shall not occupy any time with the anatomy of the parts, the symptoms of the disease, or the rationale of the various operations that have been practiced, all of which may be found in the ordinary text-books, but proceed at once to the object I have in view.

The principal cause of failure in the operation is that the retraction of the parts to be united is so strong that the wires

or threads used for sutures cut their way out before the desired union has taken place. We are unable to keep the palate perfectly at rest for a sufficient length of time to secure primary union. First, there is the natural contractility of the two halves of the fissured palate to be overcome; second, the contraction of the muscles, the tensor palati, levator palati, and the azygos uvulæ, which upon every motion of breathing or swallowing tend to re-open the united fissure; third, independent of this action the food taken is pressed against the palate, and I have seen even a case of recent union re-opened by the attempt to swallow a piece of meat. By dividing the above named muscles, by separating the soft palate from the bone, we are able to reduce the contraction of the muscles about one-third, the remaining two-thirds we are, up to date, unable to remove. I have endeavored to overcome this by the following method:

I asked myself, "Why can not the surgeon do what the shoemaker does with the holes for lacing shoes, and the tailor with his button holes—line the holes so as to enable them to resist?" The application of this principle constitutes the little device which I wish to bring to the notice of the profession.

In every case, demanding the use of sutures, where the surgeon has reason to fear that the thread or wire used would cut through before the edges of the wound are united, I recommend that sutures be passed opposite one another, through each edge, in sufficient number, loosely tied, and left in situ until the edges of the holes thus made are cicatrized, in just the same manner as permanent holes are made for ear-rings. Such cicatrized holes are applicable to the operation of cleft palate, vesico-vaginal fistula, etc., etc.

The thread or wire will not so easily cut through a cicatrix, which will resist a considerable and protracted pressure, and thus we gain time for a perfect and firm union.

A. B., aged twenty-four years, came under my treatment

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for cleft palate. An operation for hare lip had been performed in childhood. The defect begins just behind the teeth. I performed the operation according to Dieffenbach. The entire soft palate was united, but on the third day I found the threads already cutting through the edges, only one part uniting, and even this did not seem firm enough to be trusted. I cauterized according to Dupuytren; the retraction again caused a failure. I then consulted Dr. Dudley, of New York; he recommended the division of the tendons of the levator and tensor palati muscles, but nevertheless the thread and one silver wire cut through before union was perfect. Mr. B. being an excellent subject and having immense patience, permitted a fourth trial according to the new method described above. I made on each side of the soft palate four stitches with silk, knotted the threads and left them until the wounds were thoroughly cicatrized. On the twelfth day I pared the edges, passed my sutures through the prepared holes and united as usual. this time with success.

ORIGINAL LECTURES.

ART. V.—*On the Legal Responsibilities of Medical Men.* Lectures Delivered in the University Medical College, New York. By STEPHEN SMITH, M.D., Surgeon to Bellevue Hospital, New York.

[Continued from page 46.]

3. You engage to treat every case which you undertake with reasonable care and diligence. It matters nothing how much learning and experience you bring to the discharge of your duties, if you fail to give it the necessary attention you are liable to the charge of *negligence*. And "negligence is as much a fraud upon an employer as want of skill," and has

always been regarded and treated as a crime. The term "negligence" has a wide signification. You may neglect to visit your patient as frequently as you ought, and he may receive harm from the too long continuance of a particular treatment. Dressings may not be changed sufficiently frequently to meet the varying condition of injured parts. You may fail to recognize important changes in the cause of the disease, and thus lose opportunities to benefit the patient by new remedies. You may not give proper directions in prescribing powerful remedies, and the patient is injured by taking them improperly. You may operate too early or too late. In these, and in many other instances, you may be charged with culpable negligence. It is noticeable that negligence in many cases is scarcely separable from "want of skill." The truth is that they are so related that they may and will generally be included in the same charge. Hence we have the legal statement, "skill and diligence may be considered, therefore, as indissolubly associated, since skill judges of the measure of diligence required and also furnishes the latter with the eyes of observation and the hands of execution; while diligence on her part gives cumulative power to skill, and leaves no link wanting in the continuous chain of treatment." The punishment of negligence on the part of a physician has in all ages been of the severest character. In the early periods of history the death of a patient was prima facie evidence of negligence, and punishable with banishment or death.

4. You engage to practice according to the tenets of the particular school to which you belong, or, in a legal phrase, "a physician is expected to practice according to his professed and avowed system." This is an important legal discrimination which should receive more attention in our time, when so many practitioners are endeavoring to secure success by professing to treat diseases according to certain theories, and yet who change their methods of treatment to

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meet the peculiarities of practice. A change of the system of treatment in any given disease is regarded by courts as an admission of want of ordinary skill, and is construed as a fraud upon the public. The principle embodied in this decision of the courts comes down to us from the ancient Egyptians. Diodorus Siculus states that the physicians of Egypt made use of receipts prescribed by law, which were originally prepared by ancient physicians. If they could not cure their patients by these receipts they were not blamed, but if they used other remedies they were to suffer death. The justice of the rule is apparent. If a patient employs a homœopathist he is entitled to homœopathic treatment, and to nothing else, at the hands of the employé who professes to be skillful in that branch. An apothecary has as much right to give a man strychnine who applies for quinine as a homœopathic practitioner to prescribe medicine according to any other dogma than *similia similibus*, and to the theory that potency increases with dilution. Nor is the practitioner relieved of the charge of fraud when he announces to his patient that he will change the method of treatment. The declaration of his intention is an admission of want of skill in the homœopathic art. Nor, finally, can he make the change with the consent of the patient, for by such an act he still acknowledges his want of skill. It is apparent, therefore, that if the common law rule was enforced rigidly every practitioner would be compelled to practice strictly according to the public professions which he makes.

Such are some of the features of the contract which your name, with the word "Doctor" prefixed, posted on your door, establishes between you and the community. But can there be no written contract between physician and patient? Yes, certainly, you can make a special contract in any case the same as the common artisan. And it is well for you to understand your obligations under such contract, for many are tempted to enter into such agreements in the belief that

they gain special advantages. In the first place, you may contract to receive a certain sum "contingent upon the performance of a cure," but such contracts are and always have been regarded as dishonorable. The old Roman physician would not associate with a medical man who in any sense placed his profession on the level of a trade. The duties of practice were to him purely honorary. He would not even make a pecuniary charge for his attendance upon the sick. Whatever compensation he received was of the nature of a gift. This regard for the honor of the profession has continued to our time, though gradually the custom of making charges for professional attendance has extended over the civilized world. But as yet special contracts of "no cure, no pay," have not been approved. Whenever you make a special contract you must understand that you will be required to fulfill it to the letter, with a single exception, which I will presently mention. The amount of money agreed upon is not a matter of any importance. "The absolute promise to cure forms the gist of the contract." And the physician must be able to prove full compliance with the terms of the agreement. It may happen that in the course of the disease which you contract to cure some unexpected complication arises which thwarts your best efforts. Will you then be held to your contract? That will depend upon the nature of the complication. If it is accidental, and liable to occur in such a disease, you are responsible, because you should have foreseen its possibility and probability, and have made it a condition in your contract. If, however, there was in the case an element impossible to cure, in the very nature of things you would not be liable for not fulfilling your agreement. You are not bound by your contract to do acts in themselves absolutely impossible; and this forms the exception to the rule to which I just alluded. For example, if called to a case of dry gangrene commencing in the extremity of a toe, and you should agree to so treat the disease as to

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guarantee the preservation of the foot, you would be responsible, though the disease should extend to the knee in spite of the most judicious treatment; for you should have foreseen the liability of such extension of the gangrene. If, however, when called to the case the limb below the knee was entirely mortified, and you should engage to restore the foot to health, you would not be required to fulfill your contract, or rather your contract would be void *ab initio* "*Impossibilium nulla obligatio est.*"

[TO BE CONTINUED.]

CLINICAL RECORDS.

ART. VI.—*Intra-Pelvic Phlegmonous Tumor, involving Rectum, Uterus, and Sacral Plexus.* By EDWARD J. BERMINGHAM, M.D., New York, Physician to the "Chapin Home for the Aged and Infirm."

RECOVERY.

Catherine C., æt. 34, married, and the mother of two children, on September 28th, 1875, was delivered of a still-born child between the fifth and sixth months of utero-gestation. Miscarriage induced by two days' fatigue in house-hunting and carrying about with her a child about three years old. The day following she had a chill, and some tenderness over the uterus; temperature rose to 103° F., and pulse to 130. Ordered liq. morph. U. S. P. 3i. every two hours, which gave complete relief in less than twenty-four hours. The chill and fever returned a couple of days later, and a well-marked train of symptoms pointing to peri-uterine cellulitis lasted for a little over two weeks, during which she was treated by full doses of U. S. liq. morph., quinine, warm fomentations and vaginal injections, wine, and complete rest in the recumbent position. During this time the bowels moved occasionally by administering laxatives,

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such as ol. ricini or a couple of compound colocynth pills; but when the inflammatory symptoms had subsided, an evacuation of the bowel could not be produced, although gr. xx. of pulv. jalapæ comp. were given.

On October 23d, no evacuation whatever having taken place for five days, a digital examination of the rectum was made, and with the following result: An extensive and dense mass was felt completely surrounding the gut, and the same tumor could be distinctly detected by recto-abdominal and recto-vaginal manipulation. Uterus immovable. The mass was so situated that the tip of the index finger could barely be engaged in the constriction of the rectum that it had caused. It was larger than a good-sized orange, and almost immovably fixed to the pelvis, which could be rolled from side to side by grasping the tumor recto-abdominally. An enema administered did not pass beyond the stricture, but was immediately returned. I concluded that the mass was an extraordinary deposit of inflammatory material due to pelvic cellulitis. The patient suffered considerably from the accumulating feces, and on the following day the ordinary long enema tube was introduced through the constriction which hugged it, and the bowel was emptied by alternately injecting warm water to soften the feces and drawing off the watery mixture through the tube. This gave great relief for a few days.

On the morning of the 29th of October Dr. James L. Little saw the patient in consultation, and in the afternoon of the same day Dr. T. Gaillard Thomas. The result of the consultations was, that the mass was considered as a deposit of inflammatory material from pelvic cellulitis, but that there might have been some trouble of a malignant character about the rectum prior to the miscarriage, and that if such were the case, in all probability the whole mass would eventually assume a cancerous aspect. The patient was put upon tonics, and we determined to administer cream of tartar and

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surphur every evening as a laxative, and to await further developments in the case.

November 1. No evacuation for a week. Unbearable distress around the loins and down the left thigh. Operation of removing feces per long enema tube, as practiced on October 23d, repeated, which gave complete relief.

November 8. Since the emptying of the bowel a week since, a daily soft fecal evacuation has been maintained by means of the cream of tartar and sulphur, but for the last couple of days the patient has been suffering considerable pain, and this morning a slimy, bad-smelling material passed per rectum. She has been allowed occasional doses of morphia to relieve the pain, but lately this has not proved entirely effective.

November 15. A couple of days since the patient was seen in consultation by Drs. Willard Parker and D. M. Stimson, and the opinion of each of the gentlemen was in favor of the non-malignancy of the mass. It was decided to persist in the treatment for a few months, giving the iodides of iron and potassium besides.

January 1, 1876. Examination to-day revealed a decided diminution in the size of the tumor. The patient is generally free from suffering, but has occasional paroxysms of pain, which are sometimes very severe. These attacks seem to be of two kinds, first, colicky pains, which are relieved by the internal administration of turpentine; and, secondly, pain in the left hip and thigh, which is, undoubtedly, due to the involvement of the sacral plexus of nerves, and has to be relieved by morphia. The bowels move regularly by the aid of aperients, and the general condition of the patient is much improved.

February 1. Patient is still improving. The passages are more solid and are not broken into as many pieces as formerly, and there is very little distress when at stool. The pains spoken of above are considerably better also. An examina-

tion showed that the deposit was being rapidly absorbed. It has already diminished to about the size of a hen egg, and has left the uterus quite free.

A few days later Dr. Thomas again saw the case. The change in the patient's general condition as well as the marked diminution in the size of the tumor were very perceptible to him.

March 1. To-day Mrs. C. is very cheerful over the fact that she is again enabled to attend to her household duties, and also that she can now have a natural movement from the bowel every other day without the aid of medicine. I neglected to mention that sometime in the beginning of December menstruation began, but on the evening of the same day the patient became almost frantic from the intensity of the pain; and it was necessary to quiet her by a large hypodermic injection of morphia. This checked the menstrual flow, which did not again return until the middle of February, at which time it was perfectly normal. No examination made to-day.

June 30. The patient is entirely free from suffering or inconvenience of any kind. An examination showed the uterus to be perfectly free and movable; and the normal calibre of the rectum has been restored. There is still a small amount of the deposit remaining, which there is not the slightest doubt will be absorbed within a very short time.

The case is an interesting one; first, on account of the extent of the deposit. Although most gynecological authorities recognize and describe pelvic cellulitis, yet not one that I am aware of, calls attention to such an extensive deposit as occurred in this case. On this account the question as to the malignancy of the mass was thoroughly discussed at each consultation. The next point of interest is in regard to the treatment. What surgical measures would we be justified in adopting in a case of this kind? The

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patient suffered intensely at times from the accumulating feces, and the pain from pressure on the sacral nerves; and begged to have an operation of some kind performed to relieve her, as her condition was intolerable. She would take no nourishment, and at one time death from inanition seemed imminent. Lumbar colotomy was therefore discussed, as it would obviate one source of annoyance—the pressure of the fecal mass; and it would be especially indicated were the tumor at all malignant. We determined, however, upon a conservative course, and the feces, whenever accumulation in sufficient quantity to produce distress took place, were removed in the manner detailed under date of October 23.

The case, therefore, stands as a most able advocate of conservative surgery.

102 West 49th street, New York.

ART. VII.—*Cases from the service of* W. H. VAN WYCK, M.D., Physician to Charity Hospital, New York.

CASE 1. Alice Fay, æt. 24; single; domestic; born in the United States; admitted May 31, 1876. Family history unimportant. Patient denies drink and venereal disease. Declares that she was never sick until two months since, when she began to be troubled with dyspnœa, and swelling of the ankles. Has had no cough nor hæmoptysis. On admission patient was anæmic, had almost constant dyspnœa, no appetite, bowels irregular, no cough. On physical examination a few liquid rales heard over both lungs. Percussion over lungs negative. Area of cardiac dulness somewhat enlarged. A loud murmur was heard at apex, taking place of first sound, which was heard also at back. Murmur also heard at base, but very faintly. The second sound of heart could not be distinguished. Ankle sœdematous. Urine non-albuminous.

Treatment.—℞. Pulv. jalap co. ʒss. Potass bitart. ʒij. ter in die. Tr. ferri chlor. gtts. ʒxx. ter in die. Extra diet, and whisky ʒiij. daily.

June 7. Patient continued in about the same condition as on admission until this morning, when she had a severe attack of dyspnœa. Extremities became cold, and no pulse could be detected either at wrist or ankle. Patient was slightly delirious, refusing medicine at times. Heart was beating rapidly and irregularly. Murmur was audible with stethoscope, but sounds could not be separated. Pulse in carotids feeble and irregular. 9 A.M. ordered whisky, ʒss. every fifteen minutes. Hot bottles around extremities, and gave ether, ʒij, hypodermically, at 9:30 and 10:30 A.M. At noon there was no improvement in condition of patient. Whisky continued in as large doses as patient could be persuaded to swallow. At 3 P.M. pulse obtained at wrist. Feet and legs warm; hands cold; dyspnœa less. Fully conscious. Says she feels better. Gave ʒss. ether hypodermically. Whisky continued. At 4 P.M. temperature 98°.

June 8, A.M. Quite comfortable. Pulse obtainable at wrist. Feet warm, but hands still cold. Had ammon carb. grs. x. every half hour through the night. Vomited frequently, and is still vomiting this A.M. 10:00 A.M. whisky discontinued; had ether hypodermically. 12:90 M. ammon carb. continued, together with ether, hypodermically. At 3 P.M. pulse could not be obtained at wrists. The dyspnœa increased, and at 6:00 P.M. the patient died.

Autopsy.—Shows after death body medium size, well nourished; legs œdematous, commencing blood decomposition in superficial veins. Head: Brain normal; vessels normal. Thorax and Lungs: Pleuræ, both nearly filled with passive effusion. Bands of adhesion on right side posteriorly. Both lungs compressed, and are devoid of air except at apex and anterior margin. Heart: Pericardium distended with opaque, brownish fluid, containing a few flocculi. Visceral

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pericardium shows at base of heart some little sub-pericardial hemorrhage and roughened surface, and also along course of vessels some small shining bodies. Weight of heart fourteen ounces. Hypertrophy with predominant dilatation. Walls fawn color, flabby. Hypertrophy most marked on right side. Dilatation most marked on left side. By hydrostatic test, aortic and mitral vales normal, but there was regurgitation from left ventricle into auricle, by means of acardiac aneurism. This aneurism is situated in front of the right side of the anterior leaflet of the mitral valve. It presents an oval sacculated dilatation one inch by three eighths of an inch transversely, at bottom of which are two round openings about the size of a cherry. These communicate with a *sac* the size of an English walnut, situated above the right commissure of mitral valve. The opening from this into the auricle is by a round opening, smooth edges, half an inch in diameter. This opening is situated about one quarter of an inch from anterior walls of ventricle, and about two-thirds of an inch from the anterior leaflet of mitral valve. The walls of *sac* appear to be made of thickened endocardium of the left auricle. The cavity is empty. Abdomen: Liver cirrhotic, fatty, congested, (portal). Spleen firm, normal size. Kidneys chronic interstitial nephritis, active congestion. Stomach normal. Intestines: Peyers patches very prominent, and in lower portion of small intestines some of the individual follicles are congested and undergoing ulcerative processes.

Case 2.—Bridget Shackelton, æt. 47; widow; domestic; born in Ireland; admitted May 15, 1876. Patient, when admitted, was in a semi-conscious condition, and no reliable history could be obtained. She stated that she had been drinking heavily for some days, and had slept out of doors one night previous to coming to hospital. When brought into the ward her breathing was at times stertorous and irregular. She made constant efforts to drive away imaginary

objects. Her eyes were blood-shot, and alcoholic fumes from the patient were perceptible over the whole ward. Two hours after admission pulse was feeble, irregular, and beating 130 per minute; temperature 104, and respirations 64. On day of admission had bromid. potass. gr. xl. three times, and quin. sulph. gr. x. twice.

May 16.—Pulse 130, temperature 103½, respiration 63. On physical examination dullness over lower lobe of right lung, with circumscribed spots of dullness over left lung. On auscultation a few crepitant rales were heard over lower lobe of left lung; bronchial breathing over circumscribed portions of both lungs. Owing to feebleness of patient bromide was discontinued to-day, and quin. sulph. gr. x. every four hours given, together with whisky ʒvi., and two hypodermic injections of ether of ʒi each.

May 19.—Condition of patient has changed very little during the past two days. Quinine has been continued, gr. x. t. i. d., whisky given freely, and hypodermics of ether occasionally. This morning patient appears a little stronger, and respirations are more regular. Pulse 136, temperature 101½, respirations 54. Patient made several attempts to speak to-day, but could not be understood; bowels moved to-day.

May 20.—Pulse 130—more regular than heretofore, temperature 102½. Ordered quin. sulph. gr. v. every three hours, and whisky ʒss. every hour; also at 10 a. m. gave ʒi. of ether hypodermically. At noon respirations had risen to 70 per minute; pulse could scarcely be counted; temperature, 104. At 5 p. m. patient had become nearly unconscious, and could with difficulty swallow medicines. Had whisky ʒss. every half hour. Hypodermic injections of ether were continued at intervals of two or three hours during the night, but the patient continued to grow weaker, became comatose at midnight, and died at 5 a. m. of the 21st.

Autopsy, 33½ hours after death: Head—brain: vessels of

surface congested; ventricles slightly dilated, contained a small amount of fluid; brain substance œdematous. Lungs—lower lobe of left, seat of acute pneumonia in red stage; lower lobe of right markedly congested, with a number of lobular pneumonias, the largest the size of an English walnut, all passing from red stage to gray; remaining portions normal. Heart—flabby; cavities empty; normal. Liver—enlarged, pale red color; fatty. Spleen—firm; normal. Kidneys—chronic parenchymatous degeneration. Stomach and intestines—normal. Rigor mortis present. Body well nourished.

ART. VIII.—*Caries of the Head of the Humerus and Glenoid Cavity. Operation, recovery.* By F. S. GRANT, M.D., Surgeon to St. John's Riverside Hospital, Yonkers, New York.

Edward Doyle, æt. 25; single; native of Ireland; admitted to St. John's Riverside Hospital, Yonkers, N. Y., December 3, 1875.

Patient's History.—Says he has always enjoyed good health up to the time his left arm began giving him trouble, which was six months previous to his admission. He is not aware of any blow or violence inflicted upon the arm six months ago, but states he lifted very heavy timber at that time, and strained himself quite often. The trouble began with pain in the left arm at about the middle of the humerus, the pains being like cramps in character, and coming on at first in the morning, after a night's rest. By making free motion the pain, as he says, went away, and only returned after another night's rest, or a period of twenty-four hours. But this was only for a few days, then the cramps became more violent, and the pain in the arm continued through the day. He was now obliged to stop working, for the left arm was useless to him. Four months passed, the pains increasing in severity, being most severe at night, and preventing sleep. There now appeared on the inner aspect of the arm, and at its middle, a red and sensitive spot, which enlarged rapidly,

broke, and discharged some healthy pus. The pain continued without a let up, and the discharge increased in quantity, so that nearly six or eight ounces of thin, semi-purulent fluid escaped per day from the sinus. This was five months and two weeks after the first symptoms of trouble. A second sinus formed just above the first, which discharged also. During the last two weeks pus has run from the sinuses in a continual flow, and the patient states that he feels he is failing every day.

Examination of Patient.—Emaciated, weak, and hectic looking; speaks as if it were an effort, stopping between his words to take breath. In examination of chest heart sounds normal, but rapid and feeble pulsations; right lung normal, with slightly increased vocal resonance; on the left side some depression above and below the clavicle; slight vocal fremitus; dullness appreciated at the infra-clavicular region on making percussion *from* the trachea; bronchial respiration, with mucus and sub-crepitant râles, on coughing; pulse 100, rapid, weak, and often catching; temperature 104 F. in axilla (this examination being made late in the afternoon); respiration 30; tongue moist and cherry-red. Patient has a nasty, hacking cough, with tenaceous mucous expectorations, sweats profusely at night, is dyspeptic, and has some diarrhœa.

Here, then, are presented the well-marked symptoms of that stage of pulmonary phthisis which Dr. A. L. Loomis, in his recent work, "Diseases of the Respiratory Organs, Heart, and Kidneys," has designated as the *catarrhal*, viz., *dyspnœa*, due in this case to the high febrile action; symptomatic *cough* and *expectoration*, *fever*, *accelerated pulse*, *emaciation*, *disturbance of digestion*, and *diarrhœa;* to which may be added the physical signs. I have been thus particular in mentioning these symptoms because it will subsequently be shown how far they were all either cured or modified under rational and surgical treatment.

The examination of the urine, which was dark-red in color, gave no evidence of renal disease.

Examination of Diseased Arm.—Muscles of left arm flabby, and in a condition of atony from disease, particularly the deltoid muscle; the entire shaft of the humerus larger than the right—nearly double the size between its head and the sinuses; acromian end of clavicle and acromian process sharply defined—not so on the right side; the two sinuses communicating with each other superficially, and situated along the inner border of the biceps muscle at the middle of the humerus; on probing them they are found leading *upwards* towards the *joint*, and do not lead any where directly downwards or outwards to the shaft; on removal of the probe, pus flowed *downwards* and out through the sinus. Patient can not move his arm at the shoulder-joint without causing excessive *pain;* motions of the fore-arm, while giving no pain, have to be assisted by patient's right hand; slight concussion made from below upwards, with elbow at right angles, produces sharp pain in the *shoulder-joint*, and manipulations externally about the joint give flinching and pain. The diagnosis I made at this examination, the day of patient's admission, was caries of the head of the humerus, with disorganization of ligamentous and cartilaginous structures about the point. The patient was too weak to think of any immediate operation, and was put upon the following line of treatment:

For the high fever and night sweats—

℞. Quiniæ sulph., ʒi.
Acid sulph. aromat., ʒij.
M. Aqua, ʒvj.

Sig: A tablespoonful every three hours.

For his sleeplessness and diarrhœa—

℞. Bismuth subnit., ʒi.
Morphiæ sulph., gr. j.

M. et div. in chart. No. xij. Sig: One powder every two hours.

For his nutrition and weak stomach, iced milk-punch, q. s., and no other food at present. The nurse was ordered to keep the arm and surroundings clean from discharges, and the ward well ventilated.

December 4. Very weak, but able to sit up in bed through the day. Temperature this morning 102½, pulse 100; at evening, temperature 98, pulse 100. According to the chart of temperature, etc., this was the lowest temperature assumed previous to the operation, and was an evidence, I believe, of the antipyretic action of the quinine, he having up to this time taken altogether 40 grains.

December 5. Passed a good night; diarrhœa ceased; sweating not so profuse; retains milk-punch on stomach very well. Temperature in morning 100, pulse 100; in evening 101½, pulse 104.

December 6. Gave patient ether this morning, and made a careful and extended examination of the diseased region. When patient was completely relaxed I found his arm could be freely moved in all directions. On placing the left hand firmly over the head of the humerus, with the thumb in the axilla, and making wide abduction and adduction of the limb with the right hand, I distinctly appreciated a soft, grating, or nibbing sound in the ball and socket joint. This sound could only be detected by the motions alluded to. The sound elicited seemed to originate from the lower and outer side of the caput humeri and glenoid cavity. A sinus was found leading directly upwards and inwards to the joint. The operation of excision at the shoulder-joint was decided upon, but deferred until the man was in a more favorable condition. Morning temperature 102, pulse 100; evening temperature 102½, pulse 120.

December 7. Shoulder feels very sore after yesterday's manipulations; sweated profusely last night, but had no chill or rigor; sinuses continued discharging freely. Same treatment continued. Morning temperature 102, pulse 120; evening temperature 101½, pulse 110.

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December 11. Has been comfortable the past three days, temperature and pulse ranging about the same—102, 100; takes milk-punch and milk alone; sweats at night, but not excessively; allowed light food and beef tea. As he begins complaining of ringing in the ears, the quinine was decreased to three doses a day.

December 14. Pulse and temperature about steady at 100, 102; feeling better in every respect except the night sweats, which still continue; the arm being kept perfectly quiet by his side, there is very little of the former pain; operation fixed for 17th instant.

December 17. Patient has continued about the same, pulse and temperature remaining at 100, 102, with slight elevations at night. He was put on the operating table this afternoon, ether administered, and the operation of excision performed, in the presence of Drs. Jenkins, Reinfelder, and Swift, of the Medical Staff, and Dr. Swasey, to whom and Dr. Swift I would here express my thanks for valuable assistance. Esmarch's bandage was applied, and the two sinuses opened, the incision being carried down to the bone, but no disease of the bone at this point was here found. Larrey's incision for amputation at the shoulder-joint, as modified by Mr. Spence, of Edinburgh, was made over the shoulder articulation, by commencing at the coracoid process, to its outer side, and carrying the incision downwards and outwards five inches in extent, and cutting directly down upon the bone. The object of this incision is to avoid cutting the long tendon of the biceps, which is seen at the outer side of the cut and pushed aside. The anastomosing circumflex arteries were divided and spouted freely for a few moments, but soon ceased and were not ligated. The tissues were separated from the bone, the insertions of the several shoulder muscles were severed, and the joint fully exposed. On inserting the finger into the socket I could feel caries of the whole head, and of the upper and posterior edge of the glenoid cavity, to

the extent of nearly one-quarter of its circumference. The head of the bone was now tilted outwards, the chain-saw applied, and the diseased portion sawed off at the surgical neck. There was considerable oozing of venous blood into the cavity, but it was quickly taken up by sponges. With bone forceps, and with the finger for a guide, I chipped off all caries of the glenoid edge I could feel, but am not positive if it was *all* removed, as much embarrassment attended the application of the forceps, because of the venous oozing and depth of the cavity.

Hemorrhage gradually ceased on exposure to air; the arm was placed at right angles by the side and kept there by a bandage and sling; patient placed comfortably in bed and cold applications of carbolic acid water made to the arm and shoulder. Given U. S. solution morphine, teaspoonfull every hour. Evening temperature 101; pulse 100.

December 18. Passed a good night; shoulder and arm very much swollen and inflamed; cold kept applied. Morning temperature 102½; pulse 120; evening temperature 103; pulse 120. Increased the quinine to four times a day.

December 19. Morning temperature 100½; pulse 100; evening temperature 102½; pulse 120; swelling beginning to subside; sweats again profusely.

December 20. Morning temperature 100; pulse, 96; evening temperature 101; pulse 100; swelling still less; discharge of a thin, sanious fluid; cold solutions carbolic acid continued; patient very comfortable.

December 21. Morning temperature 101; pulse 110; evening temperature 99; pulse 96. From this date the pulse and temperature wavered between 100 and 99 respectively, and at the present writing (January 4, 1876) stands in the same ratio—a fact which, it is noticeable, did not occur previous to the operation, for it will be remembered that under the use of quinine in the same doses the pulse and temperature had settled down to 100 and 102 respectively.

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Therefore, it seems fair to infer that with the source of irritation removed, and by the continuance of quinine, the pulse and temperature have been brought down to nearly their normal standard.

December 25. The wound in the shoulder is discharging freely, the material discharged resembling catsup more than any thing else I can think of, and having very little offensive smell. The lower incision, which was plugged with lint, accumulated the same material, loosened the lint, which was removed to-day. Both wounds were carefully syringed out with carbolic water and dressed with lint soaked in a preparation composed of two drachms carbolic acid to one ounce olivæ oil. All swelling has subsided, and the wounds look healthy. Patient is markedly improved, appetite increased, night sweats slight; in short, his general appearance and condition better. Ordered cod-liver oil ter in die, and stopped the milk-punch.

December 27. Patient makes daily improvement. The wounds are discharging less and looking healthy. He sits up in the ward through the day.

December 30. Began bringing edges of wounds together by adhesive strips, which are changed twice a day and the wounds well cleansed. For his night sweats, which are now trifling, gave 1-50 grain sulphate atropine at night.

January 2. Has had no night sweat for three nights. The wounds are healing kindly, with little or no discharge. The arm is kept at right angles by a tin splint and hung in a broad sling.

January 4. The lower wound is nearly healed; the upper continues discharging slightly a thin, sanious ichor through a small opening, which prevents healing. Whether this is going to be a chronic discharge from diseased bone remaining along the margin of the glenoid cavity I am not yet prepared to say, but none can be felt by the probe at present.

Should caries still remain and require removal, the patient is in a very fair condition for another operation. In regard

to the catarrhal phthisis, it is certainly less; there is no cough, expectoration, or night sweats; there is less emaciation and more bodily strength, while all of the physical signs diagnostic of such a stage are hardly appreciable. Let me quote, in this connection, the following from Erichsen's *Science and Art of Surgery:* "A slight degree of pulmonary disease, however, which appears to be rather the result of the long continued irritation of the local affection than of any constitutional taint, need not be a bar to operation. In such cases I have several times had occasion to observe that the general health improved rapidly after the removal of the local disease."

The further history of this case is one of steady but gradual recovery. Between the period of January 4th and April 4th there were several slight interruptions, as it were, to the healing process which may be worth the while to mention. At one time an abscess formed in the infra-scapular region on the posterior surface; it was opened by the knife, and a communication found to exist between it and the wound in the shoulder, the water from the syringe running directly from the one out of the other. After a few strong injections of carbolized water this complete sinus entirely closed. Later on, the lower wound in the arm, which had healed, reöpened at one spot and began discharging pus, while at the same time an abscess formed immediately posterior on the back of the arm. This was opened, and a communication found established between it and the *upper* wound in the shoulder. As considerable pus had discharged from this last abscess, a rubber drainage-tube was inserted, thus affording a free escape to all accumulations. In a few days this was removed, when all discharges ceased, the different openings closed up, and the man himself began making passive motion at the false joint. This has been systematically kept up, and the patient has already begun to have considerable motion and use of the arm.

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CORRESPONDENCE.

SOME OBSERVATIONS AT HOT SPRINGS.

HOT SPRINGS, ARK., July, 1876.

MR. EDITOR: Many thanks for your invitation to write out some of my experience here for the benefit of your readers. In doing so I shall for the present refrain from any general description of the place, or its peculiarities of appearance, or idiosyncracies of habit. Indeed, Hot Springs is not like any other place in the world as to its geography, fauna, literature, or æsthetics; these are really almost indescribable. I shall confine myself to what medical readers may be supposed to be chiefly interested in.

With perhaps the most of your readers the first inquiry is apt to be, "Is there any thing in it?" To all such I can respond, Yes, very much. I see persons continually leaving Hot Springs in either complete health, or with health greatly improved, who came here a few weeks or months previous, old, chronic, broken-down invalids. This is all the more a matter of notice, from the other well-known fact, that almost all the patients who come here for treatment come here as a last resort; they have exhausted the usual legitimate resources of therapeutics. Indeed, I may say that very many of them have exhausted not only rational resources, but every thing "irregular and defective." Hence the majority of the cases which present themselves here are any thing but promising for hope of relief by any rational plan.

Of course, with the many hundreds who come here every season, many go away with little benefit, and such are apt to decry the springs as utterly valueless. The explanation is

easy. Many old chronic cases come to have such radical changes of structure, that no agencies can restore organs to a condition of health. We also find cases presenting themselves at Hot Springs which, from their very nature, should never have come, for at no time in their history could they have been fit subjects for benefit by the treatment here.

The cases which are specially benefited are chronic rheumatism, almost every variety of cutaneous disease, whether simple or specific, but particularly the latter; syphilis in all its manifestations, nasal catarrh, many cases of paralysis and neuralgia (but these not very certain), and within a few years there is coming to be an increasing confidence in the curative control of chronic uterine affections.

Such cases as organic disease of the heart, advanced pulmonary affections, organic disease of the kidneys, are usually rather injured than benefited. Hence it would always be well, and would often save the patient the trouble, fatigue, expense, and disappointment of coming here at all, if he, or his physician for him, would correspond with some of our reliable physicians here before making the experiment.

Your readers will readily infer that the waters from the several hot springs are conveyed to bath-houses in such a way that patients may have a tub bath, a vapor, a pack, or a douche, according to the peculiarity of the case and the instructions of the physicians; so, too, whatever temperature may be desired.

Many invalids come here who have had a protracted experience with drugs, *ad nauseam*, and hence make the mistake of seeking relief from the use of the waters, unaided by medicine or the advice of the physician. Now it is very true that many patients need but little more than this. Indeed, I think there is a disposition to *excessively medicate* at this place, but it is also true that drugs, proper enough elsewhere, act much more kindly and efficiently here, in connection with the baths, than they do elsewhere. Hence most patients

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find it greatly to their advantage to place themselves at once under judicious professional advice. Many who prefer to do otherwise find that at the end of several weeks they have lost time, and attempt to regain the loss with reduced finances and discouraged faith.

Another mistake which invalids make, is the expectation of a cure in two or three weeks of sojourn here. The hope is not a rational one; so we often see patients here starting for home just as the gradual alterant effect of the treatment is beginning to be of curative advantage. Such patients are frequently coming back a second season to complete a cure that a little patience would have effected at the first visit.

You may perhaps ask me *how* these cures are effected? I am free to say that I think change of climate has something to do with it; the strict diet and habit enforced by most physicians here contribute; relief from business, care, irregular eating, sleeping, and various fashionable dissipations, have their influence; but after all the baths, their cleanliness, sweating, friction, the copious draughts of hot drink, all serve as powerful eliminations, without any regard to the question of peculiar medicinal properties.

About this eliminative power there is no question. I am well satisfied that syphilitic poison, mercury, lead, and a variety of these poisons, are absolutely washed out of the system, and upon the same principle, I presume, the accumulated poisons of alcohol and tobacco are not only washed out, but at the same time the appetite for both of them is destroyed.

These, in brief, are some of the observations I have made here. If there was a more frequent and cordial communication between the profession here with the profession throughout the country, I am very confident patients would find more prompt and satisfactory results from a visit here.

Very respectfully,

EDWARD B. STEVENS, M.D.

SPRINGFIELD, OHIO, *July* 7, 1876.

Editor Ohio Medical and Surgical Journal:

DEAR DOCTOR: You know the trouble that every practitioner has with stricture of the urethra, and especially those practicing medicine in the country, and who are deprived of the advantage of all the improved instruments that the city physicians have. The country doctor may not have use for an aspirator more than three or four times during his life, and when he does the patient prefers going to the city to have it used. So you see it does not pay him to get one. But this is somewhat foreign to what I started out to write you about.

Necessity is the mother of invention. Some time ago, before I had an aspirator, I was left in charge of a patient who was suffering with retention of urine from stricture of the urethra. After repeated trials and failure to introduce the catheter, and the failure of local applications, warm and cold baths, I telegraphed for an aspirator. This was about six o'clock in the morning, and ten o'clock was as soon as I could get it. The patient was suffering agonies, and had been since ten o'clock the night before. The idea struck me that if I could get as much pressure in front of the stricture as there was behind it, that it must stretch or open so as to allow the passage of a catheter. So with this effect in view I got an 8-ounce syringe, a gum catheter, and a foot and a half of rubber tubing. I removed the wire from the catheter, slipped one end of tubing over the open end of the catheter, filled the syringe with lukewarm water, and slipped the point into the other end of the tubing. I now filled the tubing and catheter with the warm water, and introduced the catheter into the urethra up to the stricture, and then pulled it back half an inch. I then clasped the penis with my left hand, so as to compress it on the catheter and prevent the water from escaping. I then had my assistant (a n

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old colored man) force in the water. I kept this pressure up for half a minute and then relaxed my hold with left hand, and with my right I pushed slightly on the catheter and found it passed into the blad r without the slightest resistance. I then removed the tubing from the catheter and emptied the bladder. I have seen this patient since, and he told me he had to tell a physician out West of this plan before he was able to introduce the catheter. Of course, with this plan of using the catheter, care must be taken not to use force enough to rupture the urethra.

Yours truly, C. W. DUNLAP.

NEW YORK, May 27, 1876.

MR. EDITOR: It may not be uninteresting to the many readers of your valuable journal to read brief resumés of the papers and the discussions following their reading before the various medical societies of this city. I will commence by transmitting to you an abstract from memory (having taken no notes of them) of four papers read here during this month. First subject: "Fatty Degeneration of the Placenta as a Cause of Death of the Fœtus," by Charles A. Leale, M.D., before the New York Academy of Medicine; discussed by Doctors Isaac E. Taylor, E. R. Peaslee, Paul F. Mundé, and H. F. Hanks.

Dr Leale enumerated ten cases, occurring in his own practice, where, as he could clearly demonstrate, the premature death of the fœtus in utero was due either to syphilis of one of the parents, or to phthisis; to carcinoma of mother; inflammation of placenta (placentitis); fibrous and fatty degeneration of placenta; from placental apoplexy; from fright; traumatic lesions of mother; from atheromatous changes of the umbilical vessels, etc. The Doctor laid particular stress upon one point, and that was that repeated miscarriages on the part of a woman should lead the attend-

ing physician to adopt such measures best adapted to prevent them; and he claimed to have saved one child by the administration of chlorate of potash and iron to the mother, and carefully watching the sound of the fœtal heart. If these become weaker and weaker, and the child had attained the eighth month of utero gestation, premature artificial delivery should be induced. In cases of syphilis of mother, the anti-syphilitic treatment of the mother might save the life of her offspring. In phthisis pulmonalis, carcinoma, to which latter disease in the mother he had seen in one case premature delivery follow, the treatment appropriate to these affections should be instituted. The author described the appearances of the placenta where fatty degeneration had taken place; but as the appearances of fat, macroscopically and microscopically examined, is known to all, I will not worry your readers by recapitulating them. One of the placentæ, however, manifested a rare form, for which reason Dr. Leale presented the same before the New York Pathological Society in 1874. This placenta was changed into large multiple cysts, which were filled with liquid oil, so that if the cyst wall was cut in two, the oil could be poured out of it as if from a pitcher.

Prof. Isaac E. Taylor agreed with the author in the view that many repeated miscarriages can be accounted for by the occurrence of syphilis or phthisis in the mother, but had no experience regarding the carcinomatous diathesis producing the same effect. Dr. Taylor doubted somewhat, and I think justly so, the efficacy of chlorate of potash and iron in warding off the effects of such grave constitutional disturbances as claimed by Prof. Fordyce Barker and my friend Charles E. Leale.

Professor Peaslee did not think that the death of the child was always due to disease of the mother or the placental changes, but the child may die first, and the placental function having ceased, this undergoes the changes, as seen also

in normal utero-gestation after the eighth month; and he clearly pointed out that if the mother was entirely healthy, but the father syphilitic, the syphilitic spermatozoon coming in contact with a healthy ovum would produce the death of the fœtus in utero often without affecting the mother in the least. In this case the treatment should be directed to the father, and not to the mother who was perfectly well.

Dr. Paul F. Mundé had examined over two thousand placentæ, and never came across one that showed the cystic changes filled with large quantities of oil mentioned by Dr. Leale. He also agreed that syphilis might be transmitted to the fœtus by the father, while the mother was healthy.

Dr. Hawks also stated that, of all the placentæ he had seen, he had never met with cystic oily changes described by Dr. Leale.

Last evening Dr. Sturgis read notes "On the Transmissibility of Syphilis" before the New York Journal Association, and laid principal stress upon one point, namely, that if a father be syphilitic, and his child be born with undoubted signs of hereditary syphilis, the mother of that child must have also been syphilitic. He did not believe that the diseased semen alone could be the cause of the child's affection without previous infection of the mother.

Prof. Fessenden N. Otis remarked that, unless it is proved by undoubted testimony that the semen of a syphilitic father is capable of producing syphilis by inoculation, he was led to believe that syphilis was not transmissible by means of the seminal fluid of the father alone.

Dr. Quackenbos said the following facts were established beyond doubt: First, a syphilitic mother would always and invariably give birth to a syphilitic child; second, that many fathers who had syphilis were the progenitors of healthy children, otherwise how could we account for the fortunate occurrence of seeing so many healthy children born when we know that a great majority of men had, some-

time or other of their lives, been affected with syphilis? third, that he knew of several men who would have connection with a syphilitic woman, under his treatment at the time for secondary syphilis, without being infected, requiring a certain predisposition. It is well known that some men will contract so-called gonorrhœa if they have connection with a woman soon after her menstrual period, while others will not be affected in the least. So with the poison of syphilis: some persons with chancre will have very little trouble, while others will have secondary and tertiary symptoms of the severest type. Dr. Bulkley showed a girl twelve years of age who was suffering from hereditary syphilis, affecting the epiphyses of the phalanges of the forefinger and thumb of the left hand—dactylitis.

Bearing upon the question of the transmissibility of syphilis, I remarked that it is proved by the unfortunate occurrence at Pialto, in Italy, in 1862, where a number of inhabitants of the village were the victims of syphilis from impure vaccination of one child (already reported in the clinic under the head of "Notes on Syphilis"). The victims of the bungling carelessness of the vaccinating physician were conveyed at government expense to Turin, and there treated in the hospital. I stated that the question of transmissiblity of syphilis on the part of the father by means of his seminal fluid must be admitted as possible; since pulmonary consumption and cancer are known to be transmitted from father to offspring without the mother ever having suffered from these diseases. The large upper lip, transmitted for centuries from fathers to their children in the now reigning house of Hapsburg, is well known; so also peculiarities, such as six fingers on one hand, will recur in families. Even the features of children are sometimes so strikingly similar to those of their father, that by their resemblance alone I have often recognized children in the street as belonging to a certain family, without having seen them before, or knowing

to whom they belonged. Syphilis, therefore, in my opinion, can be transmitted from the father to the child by syphilitic spermatozoa, without the mother having been infected. Let us see what Prof. Isidor Neumann says of this subject, Wiener Klinik, "Diagnostic and Therapeutics of Syphilis of the Skin," March, 1876. Vienna: Urban and Schwarzenberg. Neumann says, page 52: "*Syphilis hereditaria.* Paracelsus was the first who called attention to the occurrence of hereditary syphilis, and already Anger Ferrierus adopted the view that there are three modes of propagating syphilis, viz., 1st. By means of the semen of the diseased father; 2d. By means of the ovum of the infected mother; 3d. By the blood of the mother who for the first time contracted syphilis during her pregnancy." Boerhaave, Astruc, Rosen von Rosenstein confirm the correctness of this view.

Not many years since there were a number of authors who entirely denied the occurrence of congenital syphilis. As such we mention Desruelles, Devergie, Broussais. They considered the manifestations of syphilis in new-born children as the consequences of an infection caused by the genital organs of the mother acting injuriously upon the child during its passage through those organs (infectio per partum). At present there is no doubt that hereditary syphilis exists where the symptons of syphilis show themselves either immediately at the birth of the child, or, what takes place oftener, a few days, weeks, or months later.

The forms of syphilis which we meet with after birth appear principally upon the skin and the mucous membranes, rarely in the bones, often in the epiphysis. The manifestations of hereditary syphilis show themselves ordinarily within the first three monthis, rarely later. Visceral changes, namely, gummata, occur very early, while in utero. A peculiar affection of the calcifying cartilage and the growing bones, at the junction of the epiphysis with the diaphysis, very often appears at an early date, while the symptoms of

the latest congenital syphilis show themselves only in later years (ordinarily between the twelfth and sixteenth year), mostly in the form of rapidly progressing serpiginous ulcerations, which affect the skin of the face, especially the upper lip and nose. Some syphilographers consider this form only as a recurrence of congenital syphilis, the first symptoms of which manifested themselves already, during the first year of the child's existence.

With these ulcerations of the skin the same process takes place in the cavities of the mouth, nose and pharynx, and destructions of bones occur simultaneously with them. The long bones, also, are the seats of extensive tophi. A group of such cases, with the symptoms mentioned, Neuman has described—"Allgemeine Med. Zeitung," Vienna, 1859.

The disputed question, whether syphilis is transmitted oftener on the part of the father or the mother, is not yet settled. Hunter assumed that the infection takes place from the mother only, while, on the contrary, Weidiaur, "Traité Complet des Malad. Syphil.," Paris, 1805; Baerensprung, "Die Hereditare Syphilis," Berlin, 1864; J. Mayer, "Zeitschriff d. Gesellsch. d. Aerzte, 1851," and Zeissl are of opinion that the disease of the father is the cause of congenital syphilis in the majority of cases, and that the infection of the *embryo* occurs the more probably the more recent the syphilitic affection of the father at the time of the coitus. Mayer found in forty-nine cases the mother perfectly healthy; Bednar, "Die Krankh. der Neugebornen und Sauglinge," Vienna, 1853, saw in twenty cases that the mother suffered from syphilis, and in ninety-eight cases the mother was healthy. According to Ricord, the transmission takes place from the father as well as from the mother. (*Transmission by means of the seminal fluid, by means of the ovum, or from the circulation of the mother.*) My own experience teaches me beyond a doubt that the infection occurs oftener from a syphilitic father than from a diseased mother.

Cullerier, "De l'hérédité de la Syphilis, Gaz. des Hôpit., 1854," and Von Sigmund speak of the transmissibility of syphilis *exclusively* through the mother, but the latter still admits the possibility of transmission through the father.

Oewre observed that out of one hundred and twelve children born with syphilis, ninety-five had syphilitic mothers, seventeen syphilitic fathers, or where both parents had syphilis. He recommended the introduction of premature artificial delivery, if the mothers were infected at a time when the child has already attained the age of viability. The syphilis of the father can be transmitted to the child without infecting the mother. (This was emphatically denied, and chiefly pointed out as impossible by Sturgiss) Sometimes, however, the health of the mother became somewhat impaired. Swelling of glands, anæmia, painful affections of the bones, occur in the mother without previous occurrence of syphilitic eruptions of the skin. Hutchinson, "J. Caspar, Berlin Klin., Wochenschrift, 1875." Virchow found in the placenta gummata; Oedmannson, atheromatosis, inflammation of the umbilical vessels, and intensified placentaritis; Frankel, "Archiv. f. Gynaekolog., 1873," endometritis placentaris gummosa.

W. Boek ascribes congenital syphilis entirely due to the mother. He rarely saw syphilis transmitted from the father to the child.

If the mother suffered from syphilis before conception, the child gets *hereditary syphilis.* If the mother is infected after having conceived, Boek designates the disease of the child as *syphilis congenita.* If the mother, however, becomes syphilitic during the last two months of her pregnancy, the child is born healthy. The prognosis of congenital syphilis is better than that of the hereditary form. If a woman suffered from constitutional syphilis before her puberty, she bears generally healthy children; if she gets constitutional syphilis after puberty, her children will have syphilis. The

child dies during the first few months of pregnancy, and is brought into the world in a macerated condition, or it is still-born prematurely, or dies a few days after its birth. So-called tertiary syphilis of the parents produces only exceptionally syphilis in their children. The first children are, as a rule, more seriously affected than those born at a later period. Boek saw that one mother had twelve syphilitic children. Sometimes the first child is born sick, the second is healthy, and the third is again the victim of syphilitic transmission. Diday, "Traité de la Syphil. des nouveaux nés," etc., Paris, 1854, saw in eighty-six cases of congenital syphilis the appearance of the same the first month twenty-six times, the second month forty-five times, the third month fifteen times. The later after birth the manifestations show themselves the better the prognosis. Syphilis which appears shortly before puberty is only a relapse, but not a latent one, as is generally assumed.

There are some characteristic symptoms which permit us to distinguish the congenital syphilis from that which is acquired after puberty. The paleness and the peculiar waxy lustre of these old and haggard looking children's skins of the face, the scarcity of their eyebrows and eyelashes, the difficulty of their breathing through the nose, will point to the necessity of a thorough exploration and examination of these cases. The maculæ appear in children more in the shape of pale reddish or dirty-brown colored changes, and are generally perceived at birth. If these appear after birth, then they are acquired. These are to be found on the trunk, on the extremities, especially the soles of the feet. The heels soon become excoriated and ulcerated. Affections of the mucous membranes, of the cavities of the nose, the mouth, the pharynx and the larynx, are ordinary manifestations of the disease. They are generally found with plaques muqueuses. The papules are very rare, and, if present, are covered with scales.

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The pustules show less infiltration of the neighboring or adjacent parts. Generally speaking, the characteristic copper color of syphilitic eruptions in adults is wanting in syphilis of children, in the majority of cases. The cause of this difference is easily explained by the fact that children suffering from congenital syphilis are generally anæmic and ill-nourished, and consequently the skin is shrunken, withered; there is less turgor than is found in healthy adults suffering from acquired syphilis. The appearance of syphilitic manifestations in the bones of syphilitic children is met with frequently, according to the recent observations of Waldeyer and Körner, "Beiträge zur Kenntniss der hereditaren Knochensyphilis," Virchow, Arch. B., 55. I saw two cases; the one with necrosis of the turbinated bones, the other with perforation of the hard palate. "Uber Hautkrankheiten d. Kindl. Alters, l. c." The epiphysal cartilages, especially at the peripheric ends of the radius and ulna, sometimes the humerus and the clavicula, are similarly affected, according to Wagner, "Archiv. J. Dermatol. und Syphilis," 1871, and Kassowitz, "Verschrb. d. Syphilis, Med. Jahr-Bucher, 1875." On the legs the swellings take place two inches above the malleoli; also on the phalanges, especially on the first, plainly perceivable in many instances. R. W. Taylor, "Syphilis of the Os. Syst. in Infants," New York, 1875. Entirely different from the affection described is that form of syphilis making its appearance at the age of twelve to fifteen years, called syphilis tarda. In this latter affection the first manifestation of the disease is periostitis, caries, and necrosis of bones, and the occurrence of larger gummata in these.

Hutchinson, "A Clin. Mem. of Certain Diseases," London, 1863, describes a peculiar affection of the teeth produced by congenital syphilis."

A week ago yesterday, Dr. George H. Fox read a paper before the New York Journal Association "On Bibulous Paper

as a substitute for Lint and Sponges." It is well known that teeth, when being filled by dentists, must be free from moisture, in order that the filling—gold leaf or amalgam, or whatever substance be used—adhere to the walls of the cavity and be there retained after hardening. If moisture be mixed in, the filling soon falls out. Dentists, therefore, cover the excretory ducts of the salivary glands, during their operations in the mouth, with a napkin, or, lately, with a paper called bibulous or Japanese paper. Dr. Fox observed how easily this bibulous paper absorbed moisture, and he applied it experimentally to chancroids, to excoriated nipples, to the os uteri in cervicitis, to the vagina in vaginitis, etc. He also used the same for arresting hemorrhage of the nose and other parts of the body. In coryza, where the use of handkerchiefs become themselves the source of contagion, and infect the person using them, the bibulous paper answers an excellent purpose, since it can be burned as soon as used. For the cleansing of wounds it is better than either cotton, lint, sponge, or oakum. During their menstrual periods women may use it, as is the case in Japan, instead of napkins. It can be medicated, and as such it forms a valuable dressing, even in burns and scalds, and eruptions of an exudative nature.

Before the New York County Medical Society we had a paper "On a Lost Art in Surgery," by Prof. Crosby, of Bellevue Hospital Medical College. Every one present thought that the lost art to be resuscitated was the subject of bleeding, but to our surprise Dr. C. claimed that "cleanliness was next to godliness." The Doctor gave a sketch of his services during the war of the rebellion as the first surgeon in the United States service who built a division hospital on the pavilion plan. He claims the priority of the idea of having had constructed such a hospital in the early part of the war, before that plan was made use of by the then existing sanitary commission. He gave a sketch of the diet,

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the cleanliness of patients and nurses, as well as attending physicians; and the results obtained simply by cleanliness, disinfectants, and ventilation the Doctor praised highly as main supports to a successful treatment of medical and surgical cases. But it seemed to me the main point the Doctor desired to bring forward under cover of cleanliness was, that large and costly structures might be used just as advantageously in the treatment of the sick as the proposed pavilions. The New York Medical Record published a series of articles on hospital construction, in which it was proved satisfactorily, to me at least, that in future the pavilion plan of hospitals will prevail, if the comfort and welfare of the sick is taken only into consideration, leaving out all questions of college education and facilities for medical students to obtain knowledge. Prof. Grosby stated that a ward which had been used as a lying-in ward at Bellevue Hospital, and had epidemics of puerperal fever and erysipelas in it, was transferred into a healthy surgical ward by the abundant use of chlorine gas, which, having an affinity for hydrogen, one of the elements necessary for the propagation of contagious and infectious material, destroys the germs, or whatever it might be that cause infectious diseases. There never was a healthier ward, Dr. Crosby asserted, than the one in question, and he tried to convince his hearers that every infectious disease can be stamped out by the free use of chlorine, as used by Prof. Doremus at Bellevue Hospital.

Professor Janeway showed a spleen, taken from the body of a patient, which weighed seven pounds and a half, and extended from the seventh rib down to the crest of the ileum. Patient had leucocythæmia, and never had intermittent fever. Dr. Sell mentioned a case where a spleen reached even below the crest of the ileum, and could be felt through the vagina.

I am, dear sir, yours, respectfully,

DR. RUDOLF TAUSZKY.

EDITORIAL.

It was our pleasure to attend the meeting of the State Medical Society, held at Put-in-Bay on the 20th, 21st, and 22d days of June last, and as the subject is one of professional importance, we propose to make a few remarks connected with this meeting.

The Society met last year at the same place, and has decided to meet there again next year. It has much to recommend it—the beauty of the scenery, the refreshing coolness of the lake, the pleasures of sailing and fishing during the hours of recess; and, above all, the bringing the members all together under one roof, tending, as nothing could to the same degree, to promote friendly intercourse and acquaintance, and to secure prompt attendance on the sessions. These are some of the reasons, and very good ones, too, for holding the Society's meetings at this delightful and popular summer resort. But there is something also to be said on the other side of the question.

The design of State Medical Societies is not solely to meet once a year, for scientific improvement and discussion, and to enjoy one another's society during a few days of welcome rest, but also to unite the *whole* body of the profession throughout the State in an organic whole, representative, influential, and powerful.

There are two plans of meeting which this view suggests, either that the meeting should be held always at the same place, central and accessible, like the Capital, or that it should be held at a different place each year, for the sake of drawing in all the physicians of each locality in turn. We who were there this year would doubtless all like to meet at Put-in-Bay every year, but would it be best for the Society? We noticed the usual drawback to the usefulness of such meetings, to a degree even more than usual at Put-in-Bay. This was the consumption of too much of the Society's time with so-called ethical business, much of which might without injustice be characterized as mere wrangling. Of course we can never hope to see these unfortunate subjects of discussion kept out of the Society altogether—that is clearly impossible. But as much of such business as possible should

be turned over to the appropriate committee, or committees, and kept out of the general meetings. Of course we can not here indicate exactly how this is to be done, but we may safely say to those in authority, any step in this direction will be thankfully welcomed by the Society at large.

Of the President's address we wish to speak in words of strong and hearty commendation. We were spared the usual glorification of the profession, with which we have been dosed *ad nauseam*, and which we know all about. We were not called upon to listen to bitter and useless denunciations of quackery, which always remind us of Quixote's charge on the wind-mills. Neither our love of self and of one another, nor our hatred of quacks, was appealed to, but instead we were treated to a plain, sensible, useful discourse, of great practical importance to us all, and on which we felt that the essayist was competent to instruct us all. Not only was the address a good one, but the precedent is a good one, too. If those who are engaged in special departments of practice would oftener forget themselves, and remember the general practitioners, who constitute the bulk of the profession, and in plain, unpretentious style give us the results of their more extended experience on subjects which, though within their special sphere, are still of vital importance to us all, we should think all the more of them, and gladly acknowledge the favor conferred. We were pleased to notice an unusual absence of long, prosy papers. At such meetings gentlemen should present short and practical papers, calculated to call attention to special points, and to elicit discussion, and thus add to the life and interest of the session. There are many papers that are very valuable and important in themselves, which are yet entirely out of place at such gatherings, however much they may grace the pages of the transactions. Why can not they be simply read by title and referred, so that we may have them for study and reference, without being obliged to inflict them on all, when perhaps they interest only a few?

We would suggest that a very useful addition to the machinery of the Society would be an executive or business committee, to sit during the session, arrange the order of exercises for each meeting, keep out what is clearly not to edification, and prevent waste of valuable time. If we have ventured to criticise some things, and suggest some improvements, we feel all the more bound to say that, on the whole, the occasion was one of great pleasure and improvement; and they who staid away suffered a serious loss. May we live to enjoy many more meetings of the Ohio State Medical Society.

REVIEWS.

A Manual of the Diseases of the Eye. By C. MACNAMARA, F. C. A., Surgeon to the Westminster Hospital. Third Edition. 8vo. pp. 614. Philadelphia: Lindsay & Blakiston. 1876.

That this work has met with general favor by the profession is evinced by the call for a third edition.

The first was published in 1868, and the second in 1872, during the author's residence in Calcutta. Since his return to Europe this revised edition has been brought out. Dr. Macnamara's book was written mainly for students, to place before them a clear view of the present state of knowledge of the subjects upon which it treats. This edition is not much larger than the second, and contains very few changes.

In Chapter I., which contains a brief account of the anatomy and physiology of the eye, the author objects to the current view of the mechanism of accommodation, which is, that it is effected by the ciliary muscle.

It seems to him that the increase in convexity of the anterior part of the lens, in the act of accommodation produced by this muscle, has not been demonstrated On the contrary, it seems more probable that these minute and rapid changes are brought about through some power of changing its form inherent in the lens itself, rather than that a band of unstriped muscle, situated at some distance from the lens, and which can only act on it through some intermediate structure, should induce them. Moreover, he finds difficulties in the way of the generally received doctrine. The ciliary muscle is composed of unstriped fibre, which is not usually under the control of the will; it can only act through the suspensory ligament, which is reflected from the ciliary body to the anterior surface of the lens capsule. Consequently, if the bulk of the ciliary body were to increase or diminish, the tension of the suspensory ligament should vary in a corresponding degree, and with it the accommodation of the eye, provided this process be dependent on the tension or relaxation of the suspensory ligament. Again, the ciliary muscle may be divided, and the accommodation of the eye continue in working order. Lastly, the whole of the iris has been torn away from its attachment, and the ciliary muscle, therefore, probably

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damaged, and yet the alteration in the curvature of the lens has gone on as actively as ever, proving not only that so rude an injury does not destroy the accommodation of the eye as long as the lens remains *in situ*, but, further, that these changes do not depend on the pressure exerted on the iris by the lens, as was at one time supposed. The author has also made some investigations into the minute anatomy of the primitive muscular fibre, and also of the lens fibre, which appear to him to establish a structural analogy between them, and which have forced him to the conviction that the lens itself is composed of contractile tissue, and that the complex arrangement of its fibres is in some way (how, he does not say,) subservient to the alteration in the curvature of its surface which occurs in the act of accommodation.

So far as we are aware, this view of the mechanism of accommodation is held by Dr. Macnamara alone. In the absence of direct demonstration as to the mode in which the contractile fibres of the lens produce a change in its curvature, the theory of Donders, that accommodation is brought about by the contraction of the ciliary muscle, seems to us much the more rational view.

It would be out of place here to enter into the elaborate arguments of Donders in proof of this theory. He admits, however, that while the question has been reduced to a small compass, it has not, as yet, been definitely determined by what mechanism the action of the muscle alters the form of the lens.

His views are accepted, however, by the highest authorities of the day as the nearest approach to a positive demonstration.

In Chapter II. the author gives us, as a result of his experience in India, some valuable descriptions and drawings of the normal appearances of the fundus oculi of the natives.

The fundus oculi among the natives of India is very different from that which is presented among Europeans. This contrast between the color of fundus in the two races is shown in two well executed chromos—Pl. IV., figs. 1 and 2. "This difference arises from the deep brown or black pigment which fills the hexagonal cells of the choroid in the native, and obscures the vascular structure, so that the fundus of the eye appears of a brownish-gray color; whereas in the European the incident light being reflected principally from the vascular network of the choroid, it is of a *crimson orange* hue. The precise tint must, of course, vary in each individual, depending upon the depth of coloring of the pigment contained in the hexagonal and choroidal cells."

We now pass over several chapters, with the general remark that they are excellent and concise upon the different topics of which they treat (the chapter on affections of the orbit is especially worth reading), to the chapter on conjunctival diseases. With regard to the form of caustic to be used in the treatment of prevalent conjunctivitis, the author recommends the mitigated pencil of nitrate of silver, which is composed of equal parts of nitrate of silver and nitrate of potash, or one part of the former to two of the latter.

We think this bad advice to propagate, and venture to say that the use of nitrate of silver in such strength can not long be continued without scarring the conjunctiva. In our hands the use of solutions of nitrate of silver have been far more satisfactory, and it is rarely necessary to employ a stronger one than ten grains to the ounce, while in milder cases a five-grain solution is strong enough.

Diphtheritic conjunctivitis, we are told, is a rare disease in India; but the author goes rather too far when he says "it is rare to meet with a case among the inhabitants of any part of the world, except those of Belgium and certain parts of Germany," for although this is rather a rare form of disease in this country, cases are recorded every year in the reports of our infirmaries.

In the chapter on diseases of the iris, among the causes of inflammations of this structure, the interesting observation is made that in nearly all cases of advanced leprosy plastic iritis is present. This accords also with the observations of Bull and Hanson. (Leprous Diseases of the Eye. Christiania. 1873.)

These authors, from a residence in a country where this dreadful malady is common, have had unusual opportunity for observation.

In speaking of the treatment of iritis, the author says: "As a general rule, it may be affirmed that mercury is never to be employed in iritis, except in cases of syphilis; in other instances of iritis this drug is seldom required." In the second edition of his book it was also stated: "In other cases this drug is useless and positively injurious." Thus it will be seen that the opinion of the author on the propriety of using mercury in iritis seems to be somewhat less positive than it was. Our experience does not accord with that of the author, and we would so far dissent from it as to lay down the rule that mercury should be employed in all cases of plastic iritis, whether of syphilitic origin or not, so soon as it is apparent that the synechiæ are not readily broken by the use of atropine alone. In many cases it is not necessary to carry its use so far as even to affect the gums before the synechiæ give way.

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In the treatment of the iritis, the indication of the greatest importance is to effect a cure without leaving behind any attachment of the iris, which always renders the eye subject to recurrences of inflammation, and, in many instances, we are certain that this is best accomplished by the use of mercury. On page 346, under the head of "Diseases of the Anterior Chamber," mention is made of the occurrence of *Filaria pupillosa* in the anterior chamber of the human eye. Dr. Macnamara has published two such cases in the sixteenth number of the *Indian Annals*. "There is no possibility of mistaking the appearance presented by entozoa of this kind in the anterior chamber; the creature may be distinctly seen moving about in the aqueous. Entozoa in this situation excite violent inflammation of the iris and cornea, and probably abscesses of the eye-ball, unless they be allowed to escape from the eye. This may usually be effected without difficulty, by puncturing the cornea with a narrow-bladed knife, which is to be rotated edgeways as it is withdrawn from the eye, allowing the aqueous to escape with a gush, and with it the entozoan. Filaria are very frequently seen in the eye of the horse in many parts of India."

In speaking of the ætiology of retinitis pigmentosa, the statement is made that the view that this disease is commonly to be met with among the offspring of persons nearly related to one another by marriage has not been borne out in his experience. In India the natives are most scrupulous in observing the restrictions they place upon the intermarriage of relatives; and yet Dr. Macnamara says: "I have seen a number of instances of the disease among my native patients." He thinks that this disease is usually associated with hereditary syphilis. The points in this book which have specially interested us are such as the author has derived from his experience and observations among the natives of India, but there are many others worthy of notice, did space and time permit.

The book, on the whole, is a good one, and a pleasing evidence of the scientific activity displayed by a worker in an isolated field of observation. While it is written mainly as a condensed manual for the students of his college, it can not fail to interest the general reader. The marginal notes on the contents of the paragraphs serve to greatly facilitate reference.

It is to be regretted that the printers have not done their work as well as Dr. Macnamara has his. The book is badly printed; in fact, for difficulty of reading it will compare favorably with the print of some of our daily papers.

T. R. P.

Transactions of the American Ophthalmological Society. Eleventh Annual Meeting. Newport, July, 1875. New York: Wm. Wood & Co. 1876.

This volume is much smaller than the transactions of the year before, which is mainly owing to the omission of the usual "Report on the Progress of Ophthalmology," which has hitherto been an instructive and interesting feature, and it is to be hoped will not be permanently discontinued.

Dr. O. D. Pomeroy contributes a paper on "A Case of Nystagmus, associated with Concomitant Convergent Strabismus in Emmetropic Eyes, relieved by Correction of the Squint." The strabismus was about four lines, and was cured by two tenotomies of the left and one of the right internal rectus. The acuteness of vision was 20-70 in the right and 10-70 in the left, the diminution being due to an old choroiditis.

The final effect of the operation is thus stated by the author of the paper: "Ordinarily there are no signs of nystagmus. If the eyes are turned very strongly to the left a slight oscillation of the eyes is detected, which immediately disappears on placing the eyes in a more natural position."

The result obtained is unusual, for tenotomy does not generally affect the nystagmus. Again, we would remark that in every case of nystagmus there is a point of direction in which the eyes remain quiet.

Dr. David Webster, of New York, reports "A Case of Spontaneous Cure of Sub-retinal Effusion, with an Analysis of Twenty-one Cases of the same Disease."

The case was treated by the supine position, with the result of securing a re-attachment of the detached retina. In the analysis of the cases no similar good result was secured, so that the result obtained in this case must be considered exceptionally good.

Dr. Wadsworth said that he had also seen a partially separated retina become replaced, but without treatment by the recumbent position.

A most interesting contribution of "Rare Cases, with Practical Remarks," is made by Dr. E. Williams, of Cincinnati. The series of cases in this paper are the following:

Dislocation of Lens, several spontaneous and one traumatic; *Basedow's Disease.*—In both of the cases of this disease reported, V. Græfe's operation for narrowing the palpebral fissure, by closing the lids for about an inch at the outer canthus, was performed. In the first case destructive inflammation, sloughing of the cornea; from the protracted

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pain and suppuration death ensued about four weeks after the operation.

The other patient was a healthy woman of forty years. The operation was done for the same reason. Dangerous inflammation ensued two days after, but was subdued by removing the stitches, and treatment by frequent instillations of atropine. Dr. W. thinks "that the pressure of the narrowed commissure in both of these cases caused strangulation and subsequent inflammation." The writer of this abstract has lately seen a case in which the operation, made only to relieve the deformity, was followed by no untoward symptom, and resulted in great relief to the appearance of the eyes.

Anesthesia retinæ.—Three cases are reported; two were cured by hypodermic injections of strychnine; the third was unimproved,

Binocular temporal hemiopia.—The patient æt. 44, and a robust, healthy-looking man. Six years before he had epipleptic fits, but had been free from them for four years. Has not complained much of headache, but of severe pain in back of neck; nausea; no vomiting; impairment of intellect; the outer half of the field of each eye; no lesion of fundus. "In this instance the lesion must have existed at the anterior part of the optic chiasma, between the roots of the optic nerves." It is to be regretted that the patient was lost sight of, preventing the possibility of a *post mortem.*

Strabismus, with rigidity of the muscle.—Four very interesting cases are given, in which the performance of tenotomy was rendered difficult by the rigidity of the internal rectus. In one case the hook was gotten under the muscle with great difficulty, and when the tendon was cut a drop of vitreous made its appearance. Four days, with the eyes constantly closed, brought about recovery without the slightest pain or trouble. The result of the operations were good in all of the cases, but there was great reduction of mobility.

Dr. Strawbridge, of Philadelphia, under the title "Ophthalmic Contributions," reports some interesting cases.

Hysterical blepharoptosis, which was treated by the plan proposed by Dr. Mathewson, by means of a gum band fastened to the skin of the lid and forehead. On account of the difficulty encountered in securing a firm attachment of the rubber, adhesive plaster was substituted. Several weeks of treatment effected a cure.

Foreign bodies in the Eye-ball.—Three cases are enumerated. In the first an iron splinter remained for two years in the sclerotic without producing any great degree of reaction. In the second case a foreign

body passed through cornea, iris, and lens, and lodged in sclerotic, near the papilla. The injured eye was removed ten years later on account of sympathetic trouble of the other. In the fourth case a foreign body remained encysted in the iris for twenty-one years, without producing any trouble. In one other case a foreign body was removod by iridectomy.

Connective tissue growth in Vitreous, the appearance of which can be best understood by reference to an accompanying plate. A case is also reported in which cholesterine crystals were found in the anterior chamber, and on the anterior surface of the iris, as well as in the vitreous humor. The eye-ball was atrophied by inflammatory process, and removed on account of sympathetic trouble in the other.

Dr. Stevens, of Albany, relates a case in which he extracted a foreign body from the retina by the aid of the ophthalmoscope, with the result of preserving the appearance of the eye, although there was no useful vision.

William Thomson, of Philadelphia, contributes an original paper, in which he maintains that "staphyloma posticum may be induced by astigmatism."

"On the Increase of Refractive Power of a Plano-cylindrical Lens when Rotated about the Axis," is the title of a mathematical paper by Hoy, of Boston, which can not be understood except by reference to his formulæ and diagrams.

"Some Peculiar Phenomena attending a Case of Sudden Temporary Loss of Hearing and Sight." H. W. Williams, of Boston. The case of a little girl who became suddenly deaf, and four weeks after blind. There being no abnormality of the organs of sight or hearing, and no cerebral symptoms, the condition was supposed to be due to reflex irritation from worms in the intestines. The expulsion of a large amount of tape-worm was followed by complete restoration of sight and hearing.

"Two Cases of Vascular Disease of the Orbit." This is a continuation of a report of two cases, one of which was first published in the American Journal of Medical Sciences, July, 1870, and a brief account of the other was given in the same Journal by Dr. Newton. In the first case, aneurism by anastomosis of the left orbit, with hypertrophy of the whole side of the face. There has been very little change since the last publication, except that the aneurismal bruit had almost ceased. The other case is one of pulsating exophthalmos following injury, with probable fracture of the skull. Treatment by continuous, and after-

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wards intermittent, pressure of the carotid was employed at first without decided result. The patient, however, still kept up intermittent pressure at frequent intervals each day. At the end of six months he wrote to report improvement, and at the end of two years the prominence of the eyes had entirely disappeared. There was still some bruit, and he continued to practice compression for several months longer, until all symptoms disappeared, which was three years after the beginning of treatment. The Doctor then makes some very interesting reflections on the difficulty of diagnosis of so-called "orbital aneurisms," and concludes his interesting paper by a summary of the cases in literature in which post-mortems were recorded, with the following analysis of fourteen cases: Venous clot from phlebitis, four cases; venous dilatation from phlebitis, two cases; malignant growths, three cases; post-orbital varix, two cases.

A most interesting case of pulsating exophthalmos of both eyes, in which the common carotid was ligated, with the result of entirely curing the patient, as well as restoring vision, which was entirely abolished, is reported by Dr. E. Gruening in the Archives of Ophth. and Otology, Vol. V., No. 1. Dr. G. has also written a very interesting historical and critical paper on the literature of the subject, which he read last winter at the New York Medical Library and Journal Association, and which we hope will be published.

Dr. Thomson, of Philadelphia, reports "A Case of Sektor-like Defect of the Field of Vision." The patient, æt. fifty, was in good health at the time of examination; four years ago had sudden vertigo; was insensible for a few moments; his hands were numb for some days; his vision was disturbed then, and remains so until now; there is partial loss of vision in the upper and left part of each field. It was an interesting fact that the macula was not involved in the blindness which affected the retina, both above and below it. The conclusion is that "there is little doubt that four years ago there was an apoplectic attack which induced the partial hemiopia, and that it was caused by a lesion of the left side of the brain."

"An Obituary Notice of Dr. Edward Delafield," the first President of the Society, was presented by Drs. Dix and Williams, of Boston.

"A Case of General Sarcoma of the Choroid Probably Congenital." Dr. R. J. McKay and Dr. H. C. Eno. The day after the patient's birth the right eye and right side of face were swollen. When the child was three and a half years old the eye was enucleated. Dr. A. Jacobi, who saw the patient, thought that the disease was probably a sarcoma

which started early in life from the dental papilla, and that it extends into and encroaches upon the cavity of the antrum. Dr. Eno says: "The case is one of general choroidal sarcoma, without the formation of a distinct tumor. Inasmuch as the eye-ball was enlarged and protruded at the time of birth, and there existed a congenital tumor of the antrum, it is not improbable that the new growth in the choroid also commenced during intra-uterine life."

"A Case of Consecutive Enucleation of Both Eyes for Recurring Glioma." By C. R. Agnew and H. C. Eno, New York. At the age of thirteen months the patient came to Dr. A. He advised immediate enucleation of the left eye on account of glioma. Six months after the right eye was enucleated for the same reason. There was no return of the growth in the orbits after eighteen months. Dr. Eno reports: "In one eye half of the vitreous, and in the other nearly the whole of it, was occupied by a mass of glioma."

Dr. Green, of St. Louis, reports favorable results from iridotomy by Von Wecker's method, and also negative results of "Examination of the Eyes of a Criminal Executed by Hanging." The examination showed no lesion of the lenses or capsules, or of the retina or choroid of either eyes. Dr. Green also recommends the use of a solution of atropine in castor oil, and recommends the substitution of the alkaloid for the salt, the latter not being readily soluble in oil.

"Improvement in Spectacle Frames." By H. D. Noyes, of New York. He suggests a contrivance for making reversible frames. To overcome the spherical aberration for glasses of short focus, he recommends that two plano-convex lenses be put together, with their convex sides towards each other.

Dr. Noyes, in connection with Dr. Webster's paper, said that "among forty-three cases of sub-retinal effusion in private practice, he had only seen one in which the fluid was spontaneously absorbed."

A note from the Secretary informs us that eight cases of spontaneous cure of sub-retinal effusion will be reported by Dr. Althof at the next meeting.

The next meeting of the Society will be held in New York City September 11, 1876, one day before the meeting of the International Ophthalmological Society. T. R. P.

REPORTS OF SOCIETIES.

ASSOCIATION OF AMERICAN MEDICAL COLLEGES.

A convention of representatives of numerous medical colleges of the United States was held in the hall of the Jefferson Medical College, of Philadelphia, June 2d and 3d, 1876, in pursuance of the following call:

LOUISVILLE, Ky., May 15, 1876.

Following a general correspondence with the various medical colleges of the United States, the undersigned issue this call for a convention, to be held in Philadelphia, on Friday, June 2, 1876, four days in advance of the meeting of the American Medical Association. The object of the convention is to consider all matters relating to reform in medical college work.

That decided results may be reached, the faculty of each college is requested to send one or more delegates, clothed with *plenary* powers to determine final action on every question.

Should any college find it impracticable to send a representative, it is hoped that it will set forth fully by letter to the convention the views it may hold touching the suppression of existing evils and methods of practical improvement.

Officers of the following colleges have informally signified their hearty approval of the movement:

Jefferson Medical College, College of Physicians and Surgeons, N. Y., Bellevue Hospital Medical College, Ohio Medical College, Miama Medical College, Rush Medical College, Detroit Medical College, Louisville Hospital Medical College, Medical Department of University of Louisville, St. Louis Medical College, Keokuk Medical College, Cleveland Medical College, Starling Medical College, Medical Department of Georgetown College, Medical Department of Columbian University, Long Island College Hospital, Medical Department of Syracuse University, Evansville Medical College, Indiana Medical College, Medical Department of University of Nashville, Atlanta Medical College, Mobile Medical College, Savannah Medical College, Augusta Medical College.

The convention will be called to order in the hall of the Jefferson Medical College at 11 o'clock A.M. on the day above named.

J. B. BIDDLE, M.D., Jefferson Medical College.
WM. H. MUSSEY, M.D., Miama Medical College.
JOHN T. HOGDEN, M.D., St. Louis Medical College.
J. ADAMS ALLEN, M.D., Rush Medical College.
W. T. BRIGGS, M.D., Med. Dep't University of Nashville.
J. M. BODINE, M.D., Med. Dep't University of Louisville.

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At the hour named the following representatives assembled:

Jefferson Medical College—Prof. J. B. Biddle and Prof. S. D. Gross.
Medical Department University of Pennsylvania—Prof. R. E. Rogers.
College Physicians and Surgeons of New York—Prof. Edward Curtis.
Medical Department University of Louisville—Prof. L. P. Yandell, Jr., and Prof. J. M. Bodine.
Hospital College of Medicine of Louisville—Prof. J. A. Larabee and Prof. T. C. Wilson.
Long Island Hospital Medical College—Prof. J. H. Raymond.
Medical Department University of Iowa—Prof. E. Clapp.
College of Physicians and Surgeons Syracuse University—Prof. H. B. Wilbur and Prof. Van Duyn.
Chicago Medical College—Prof. L. Curtis.
Medical Department University of Georgia—Prof. E. Geddings.
Indiana Medical College—Prof. T. B. Harvey and Prof. L. D. Waterman.
Medical Department University of Wooster—Prof. W. J. Scott.
Cleveland Medical College—Prof. J. H. Bennett and Prof. Heims.
Detroit Medical College—Prof. E. W. Jenks and Prof. L. Connor.
Starling Medical College—Prof. S. Loving.
Medical Department University of Vermont—Prof. H. D Holton.
St. Louis Medical College—Prof. J. L. B. Alleyne.
Atlanta Medical College—Prof. W. F. Westmoreland.
Medical Department University of Nashville—Prof. W. T. Briggs.
Medical Department Vanderbilt University—Prof. T. A. Atchison.
Missouri Medical College—Prof. A. P. Lankford.
Keokuk College Physicians and Surgeons—Prof. J. J. M. Angier.
Columbus Medical College—Prof. J. F. Baldwin.

On motion of Prof. Yandell, Prof. J. H. Biddle was elected President of the convention, and on motion of Prof. Bennett, Prof. Leartus Connor was elected Secretary.

On motion of Prof. E. Curtis, it was

Resolved, That the action of the convention shall not be considered binding upon the colleges represented unless indorsed by their respective faculties.

On motion of Prof. Gross, it was

Resolved, That a committee be appointed to submit business for the consideration of the convention, to report at the afternoon session.

The Chair appointed as this committee Prof's. Bodine, Gross, Geddings, Holton, and Scott.

The convention adjourned until four P.M.

Pursuant to adjournment, the convention reassembled at four P.M., the President in the chair.

The minutes of the last meeting were read and approved.

Prof. Bodine, from the committee to prepare business for the convention, reported the following questions for its consideration:

1. Shall the beneficiary system, with its present abuses, be condemned or indorsed?

After discussion, on motion of Prof. E. Curtis, the following preamble and resolutions were adopted with reference to question first:

Whereas, The practice of reducing or remitting in individual cases the established fees of a college has the objectionable feature of dis-

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criminating between students who may be equally deserving, and opening the door to possible gross abuses; therefore,

Resolved, first, That this convention regards the above privilege as one to be deprecated in general, and, if put into practice at all, to be exercised both rarely and reluctantly, and only in unusual circumstances, and after unsolicited application by proven deserving candidates.

Resolved, second, That any thing like a wholesale system of such reduction or remission of established fees, or any open solicitation of recipients of such favors, be regarded as in the highest degree improper, and that any college indulging in such practices deserves to forfeit its place on the *ad eundem* list of medical colleges.

Question 2. Shall two consecutive courses of lectures in one year entitle students to become candidates for graduation?

On motion of Prof. E. Curtis, it was

Resolved, That it is the opinion of this convention that no two consecutive sets of lecture tickets shall be regarded as fulfilling the usual prerequisites of instruction for graduation, where the time between the beginning of the first course and the end of the second is less than fifteen months.

Question 3. Shall any faculty under any circumstance issue a diploma not bearing the graduate's name?

On motion of Prof. Waterman, it was

Resolved, That no medical faculty should issue a diploma not bearing the graduate's name.

It was ordered that the meetings of the convention shall be at ten A.M. and four P.M. On motion, the convention adjourned.

The convention reassembled on Saturday, June 3, at ten A.M., the President in the chair.

The minutes of the previous meeting were read and approved.

On motion of Prof. L. P. Yandell, Jr., the regular order of business was suspended, and communications were read from the faculties of the following medical colleges: Louisville Medical College, Kentucky School of Medicine, Evansville Medical College, Rush Medical College, Medical Department University Louisiana, Medical School of Harvard University, Savannah Medical College, Cincinnati College of Medicine and Surgery, Medical College of State of South Carolina.

On motion of Prof. Atchison, these communications were placed on file.

Question 4. Shall this convention resolve itself into a permanent organization?

On motion of Prof. Atchison, it was

Resolved, That the question be referred to a committee of five, to report at the afternoon session.

The Chair appointed as this committee Prof's. Atchison, L. Curtis, E. Curtis, Yandell, and Scott.

On motion of Prof. Rogers, the President and Secretary of the convention and Prof. Atchison were appointed a committee on publication.

Question 5. Is there any reason why the customary diploma fee shall be abolished?

On motion of Prof. Rogers, it was

Resolved, That it is the sense of the convention that the diploma fee should not be abolished.

Question 6. Is it advisable to adopt a graded course of study?

On motion of Prof. Bodine, the following preamble and resolution were adopted in reference to this question:

Whereas, A knowledge of the elementary branches of medicine should precede a study of the practical branches.

Resolved, That, in the hope of inducing students to prolong and systematize their studies, this convention recommends to all medical colleges to offer to students the option of three courses of lectures, after a plan similar to the following: Students who have attended two full courses of lectures on anatomy, chemistry, materia medica, and physiology, may be examined upon any of these subjects at the end of their second course. During the third course such students may devote themselves to the lectures upon the theory and practice of medicine, surgery, obstetrics and diseases of women and children, upon which subjects only they shall be examined at the final examination for the degree of M.D.—their standing, however, to be determined by the results of both examinations.

On motion, adjourned until four P.M.

The convention reassembled at four P.M., the President in the chair The minutes of the last meeting were read and approved.

Prof. Atchison, from the committee to whom the subject of permanent organization was referred, reported the following resolutions:

Resolved, 1. That this *convention* now proceed to form a Provisional Association of American Medical Colleges under its present officers.

Resolved, 2. That when the Association adjourns it shall adjourn to meet at the call of its President.

Resolved, 3. That the various medical colleges be invited to take into consideration the project of forming, at the next meeting of this Provisional Association, a permanent Association of American Medical Colleges.

Resolved, 4. That for the furtherance of this object, a committee of three be appointed at this meeting to confer by letter with the various colleges, and invite their views on the proper object and plan of such proposed organization; and upon the receipt of the same to draft a constitution and by-laws for a permanent Association, to be submitted at the next meeting of this Association.

Resolved, 5. That the advisory resolutions upon matters of college policy passed by this convention be printed and forwarded to all regular medical colleges in the United States for their consideration.

The Chair appointed as committee to carry out the foregoing resolutions Prof. T. A. Atchison, Prof. Edward Curtis, and Prof. L. P. Yandell, Jr.

These resolutions were adopted, and the convention resolved itself into the Provisional Association of American Medical Colleges.

Question 7. Is it proper for a regular college to have any kind of alliance with homœopathy?

On motion of Prof. Atchison, it was unanimously

Resolved, That, in the opinion of this Association, medical colleges ought not to recognize or hold fellowship with any school or its alumni in which irregular medicine is taught as a part of the curriculum.

Question 8. Can college fees be made uniform?

On motion of Prof. Geddings, this question was referred to a committee of five, to report at the meeting of the Association to be held in 1877.

The Chair appointed Prof's. Geddings, Gross, Angier, E. Curtis, and L. Curtis this committee.

On motion of Prof. Biddle, the following resolution was unanimously adopted:

No degree in medicine should be conferred, under any circumstances, except after an examination in person of the candidate upon all the branches of medicine.

On motion of Prof. Atchison, the thanks of the Association were tendered to the President for the able and impartial manner in which he had discharged the duties of the chair.

On motion of Prof. Yandell, the thanks of the Association were tendered to the Secretary for his efficient services.

On motion of Prof. Larrabee, the thanks of the Association were tendered to Jefferson Medical College for the use of the hall and other courtesies.

On motion, the Association adjourned, to meet at the call of the President.

J. B. BIDDLE, M.D., *President.*

LEARTUS CONNOR, M.D., *Secretary.*

INTERNATIONAL MEDICAL CONGRESS.

The International Medical Congress will be formally opened at noon on Monday, the 4th day of September.

The sessions of the Congress and of its Sections will be held in the University of Pennsylvania, Locust and Thirty-fourth streets.

The general meetings will be held daily, from ten to one o'clock. The Sections will meet at two o'clock.

Luncheon for members of the Congress will be served daily in the University building from one to two o'clock.

On Wednesday evening, September 6, Dr. J. J. Woodward, U.S.A., will address the Congress on the "Scientific Work of the Surgeon-General's Bureau."

The public dinner of the Congress will be given on Thursday evening, September 7, at seven o'clock.

The registration book will be open daily from Thursday, August 31, to Saturday, September 2, inclusive, from twelve to three P.M., in the hall of the College of Physicians, northeast corner of Thirteenth and Locust streets, and at the University of Pennsylvania on Monday, September 4, from nine to twelve P.M., and daily thereafter from nine to ten A.M. Credentials must in every case be presented.

Letters addressed to the members of the Congress, to the care of the College of Physicians, northeast corner Locust and Thirteenth streets, Philadelphia, during the week of meeting, will be delivered at the University of Pennsylvania.

The secretaries of State and Territorial medical societies are requested to forward without delay to the Chairman of the Committee on Credentials, I. Minis Hays, M.D., 1607 Locust street, Philadelphia, lists of their duly accredited delegates to the Congress.

Delegates and visitors intending to attend the Congress are earnestly requested individually to notify immediately the same committee.

This information is desired to facilitate registration, and to insure proper accommodation for the Congress.

Members intending to participate in the public (subscription) dinner of the Congress will please notify the Secretary of the Committee on Entertainment, J. Ewing Mears, M.D., 1429 Walnut street, Philadelphia.

Gentlemen intending to make communications upon scientific subjects, or to participate in any of the debates, will please notify the Commission before the 15th of August.

NOTICE.

At an informal meeting of the undersigned, held in Philadelphia, at the rooms of the Section of Practical Medicine, of the American Medical Association, Wednesday, June 7, 1876, after the election of a Chairman and Secretary *pro tem.*, it was resolved to call upon such American physicians as had evinced a special interest in dermatology to unite in forming an American Dermatological Association.

Resolved, That the meeting for organization be held in the University of Pennsylvania, Philadelphia, on Wednesday, September 6, 1876, at six P.M., or immediately after the close of the meeting of the Section of Dermatology and Syphilology of the International Medical Congress on that day.

It is sincerely desired that you will be present and aid in the organization. Please signify your pleasure at the earliest opportunity, and oblige

Very truly yours,

L. D. Bulkley, *Secretary pro tem.*, 1 East Thirty-third Street, N. Y.
Edward Wigglesworth, Jr., *Chairman*, Boston, Mass.
Louis A. Duhring, Philadelphia, Pa.
Lunsford P. Yandell, Jr., Louisville, Ky.
George Henry Fox, New York.
J. E. Atkinson, Baltimore, Maryland.

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BOOK NOTICES.

Lectures on Orthopedic Surgery and Diseases of the Joints. Deliverd at Bellevue Hospital Medical College during the Winter Session, 1874-75, by LEWIS A. SAYRE, M.D. Illustrated by 274 Wood Engravings. New York: D. Appleton & Co. 1876. pp. 476.

This work, by the foremost American authority on the subject, is destined to take a high place in our standard medical literature. The form of clinical lectures, while it militates against that careful and systematic consideration of subjects usually looked for in a text-book, is more than compensated for by vigor and directness of style, in which respect Dr. Sayre is to be highly complimented.

The author's position, as a pioneer and innovator, has made him somewhat dogmatic and controversial at times, but never offensively so; and where we are not prepared at once to agree with him, he commands our attention, and sets us thinking. We have no space for any thing like a review of so important a work, but can only say in conclusion, that every practitioner should hasten to procure and read the book for himself.

The Student's Guide to Dental Anatomy and Surgery. By HENRY SEWILL, M.R.C.S., etc. Philadelphia: Lindsay & Blakiston. 1876. pp. 203.

This is an excellent little manual on its subject. Not only dentists, but physicians as well, may find in its pages a ready reference for much that it is desirable for them to know and bear in mind. The portions on the histology and development of the teeth are specially worthy of commendation.

Third Annual Report of the Secretary of the State Board of Health of the State of Michigan for the Fiscal Year ending September 30, 1875. Lansing: State Printers. 1876. pp. 170.

Such an excellent volume as this is the best argument that could be offered for the universal establishment of State Boards of Health. The State of Michigan is much to be congratulated on the high character of the gentlemen composing its sanitary board, and of the work they put forth. No one can even glance over the pages of this Report without pleasure and profit.